EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

GUY HUBBARD
Machine Tool Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL

New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE

Pittsburgh — *Chicago*
R. L. HARTFORD — J. F. POWELL

Detroit — *Washington*
A. H. ALLEN — L. M. LAMM

London
VINCENT DELPORT

BUSINESS STAFF

G. O. HAYS
Business Manager

C. H. BAILEY
Advertising Service

New York . E. W. KREUTZBERG, B. C. SNELL
Pittsburgh . . . S. H. JASPER
Chicago . . . L. C. PELOTT, W. F. O'DELL
Cleveland . . . R. C. JAENKE, D. C. KIEFER

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York . . . 110 East 42nd St.
Chicago . . Peoples Gas Building
Pittsburgh . 1800 Koppers Building
Detroit . . 1010 Stephenson Building
Washington . National Press Building
Cincinnati . . . 282 Sinton Hotel
San Francisco . . 2413 Milvia St.
Berkeley, Calif., Tel. Berk. 7354-W
London . . . . Caxton House, Westminster, S.W. 1
Berlin . Berlin, N.W. 40, Roonstrasse 10

• ● •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice Presidents; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

Copyright 1939 by the Penton Publishing Co.

STEEL

ESTABLISHED 1882

Contents

Volume 104—No. 3 **January 16, 1939**

READER COMMENTS 9
AS THE EDITOR VIEWS THE NEWS 13
NEWS
- Holding Our World Trade Against Foreign Threats 15
- Trends in Steel Analyzed at Scrap Convention 18
- Financial News of the Steel Industry 20
- Labor News 20
- Steelworks Operations for Week 21
- Men of Industry 22
- Obituaries 23
- Meetings 27

WINDOWS OF WASHINGTON 25
MIRRORS OF MOTORDOM 29
EDITORIAL—More Factual Information Is Needed 32
THE BUSINESS TREND
- Activity Index Regains Part of Recent Losses 33
- Charts and Statistics 33-35

FORUM ON RE-EMPLOYMENT 36
TECHNICAL
- In-Line Nonferrous Mill 38
- Small-Plant Purchases Can Be Systematized 45

POWER DRIVES
- Gearmotor Applications 42

MATERIALS HANDLING
- Truck and Bus Frames 48

JOINING AND WELDING
- Automatic Carbon Arc 52

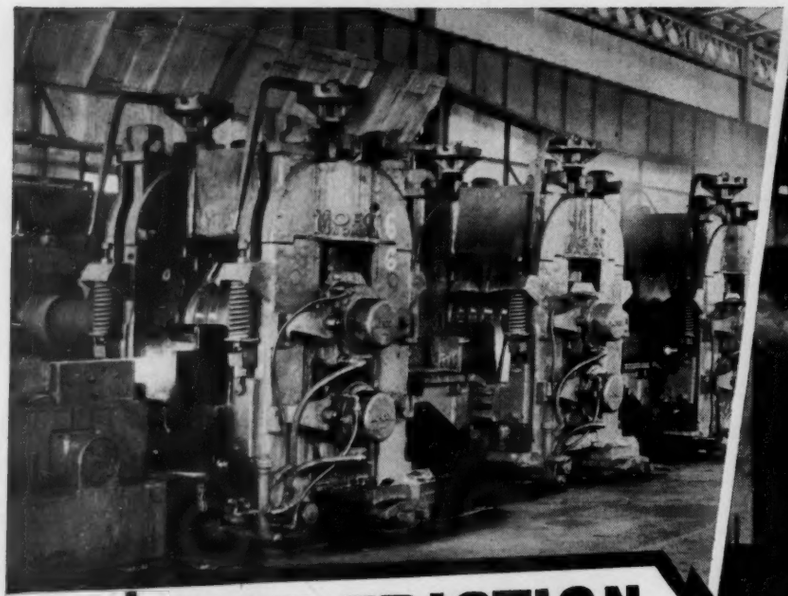
METAL FINISHING
- Cleanability 54

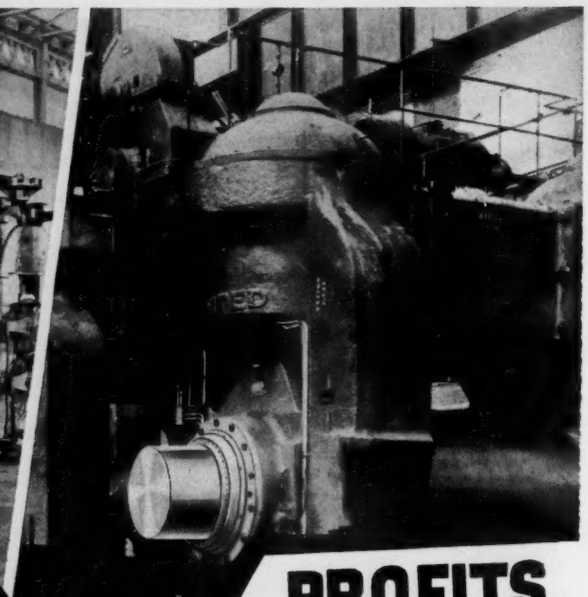
PROGRESS IN STEELMAKING
- New Hot Mill 56

NEW METAL PRODUCTS 59
INDUSTRIAL EQUIPMENT 60
HELPFUL LITERATURE 67
MARKET REPORTS AND PRICES 69
- The Market Week 70

BEHIND THE SCENES 78
CONSTRUCTION AND ENTERPRISE 84
INDEX TO ADVERTISERS 90

PRODUCTION · PROCESSING · DISTRIBUTION · USE





DON'T LET FRICTION BURN YOUR PROFITS

Morgoil Bearings Ride on a Film of Oil

A mirror-finished sleeve fitted over and keyed to the roll neck, rotates within a cadmium alloy bushing upon an unbroken film of oil. Morgoil Roll Neck Bearings cannot be equalled for low coefficient of friction, high load capacity, and freedom from wear.

MORGOIL BEARINGS are standard equipment on all Morgan Mills and are available in all sizes and capacities for replacement in other mills.

Constantly increasing rolling pressures, higher speeds, and closer tolerances introduce serious problems. Morgan Construction Company is prepared to survey your mill with a view to removing "bottle necks"; to tune up production by eliminating lags that cause lost business in today's—and tomorrow's—markets. A Morgan Report will give you the facts, and may open the way to new profits without heavy investment.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS, U. S. A.

R-49

Let MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *Remove the Lags*

As the Editor Views the News

■ DESPITE fears engendered by changing world conditions, our export trade in metals and metal products will flourish. STEEL'S survey among students of foreign trade (p. 15) reveals the general expectation that our 1939 exports of metals and metal products should average well above the 1938 level and that exports of machine tools and some other products should mount to new all-time records. Active demand is coming from abroad for American mass production goods like automobiles, radios and refrigerators. American steel also is finding a growing world market. Results of the recent Pan-American conference at Lima are regarded by well-informed authorities as reassuring to American trade. There is little concern over competition by totalitarian states.

♦ ♦ ♦

The business news continues to improve. Steel production last week moved up another half-point (p. 21) to 52 per cent of ingot capacity. Mounting business made December (p. 19) the best month last year for machine tool orders; domestic demand is accelerating. The market for rolled steel products is featured (p. 69) by an expanding volume of inquiry. The expected improvement in demand for railroad equipment and materials is beginning to materialize. . . . Defense plans rapidly are approaching crystallization. Last week the President (p. 25) asked congress to appropriate $525,000,000 for military purposes; of this a considerable portion would stimulate the so-called capital goods industries. The program contemplates the purchase of at least 3000 airplanes.

Machine Orders Up

♦ ♦ ♦

Under investigation is the applicability of a new stainless-clad steel not yet in commercial production. The alloy is placed on the surface by carbon arcs (p. 30) and rolled down with the base metal; proportion of alloy to total weight may be as low as half of 1 per cent. . . . The zinc industry advises the state department that it is suffering losses (p. 27) as a result of the 20 per cent reduction in import duties on slab zinc and zinc ore under the recent trade agreement with Canada. . . . The President's committee for the study of government questionnaires reported last week (p. 26) that there is much unnecessary overlapping in information requests by various government departments; it urged broad changes in laws so as to reduce this burden to industry.

Too Many Reports

♦ ♦ ♦

Taxes have an important bearing on the problem of providing jobs for our nine or ten million idle employables. One authority (p. 36) holds that unsound tax laws prevent capital from working at capacity. He suggests changes calculated to encourage industrial expansion. . . . The new straightline mill at Bridgeport, Conn., marks an important advance in the nonferrous metal industry. The mill (p. 38) has many unusual features and all operations are completely mechanized. It has capacity for rolling 72,000,000 pounds of copper and copper-base alloys per year. . . . A recent survey (p. 44) reveals that approximately 80 per cent of all industrial motors of one or more horsepower are connected to the driven machines through some from of speed reduction.

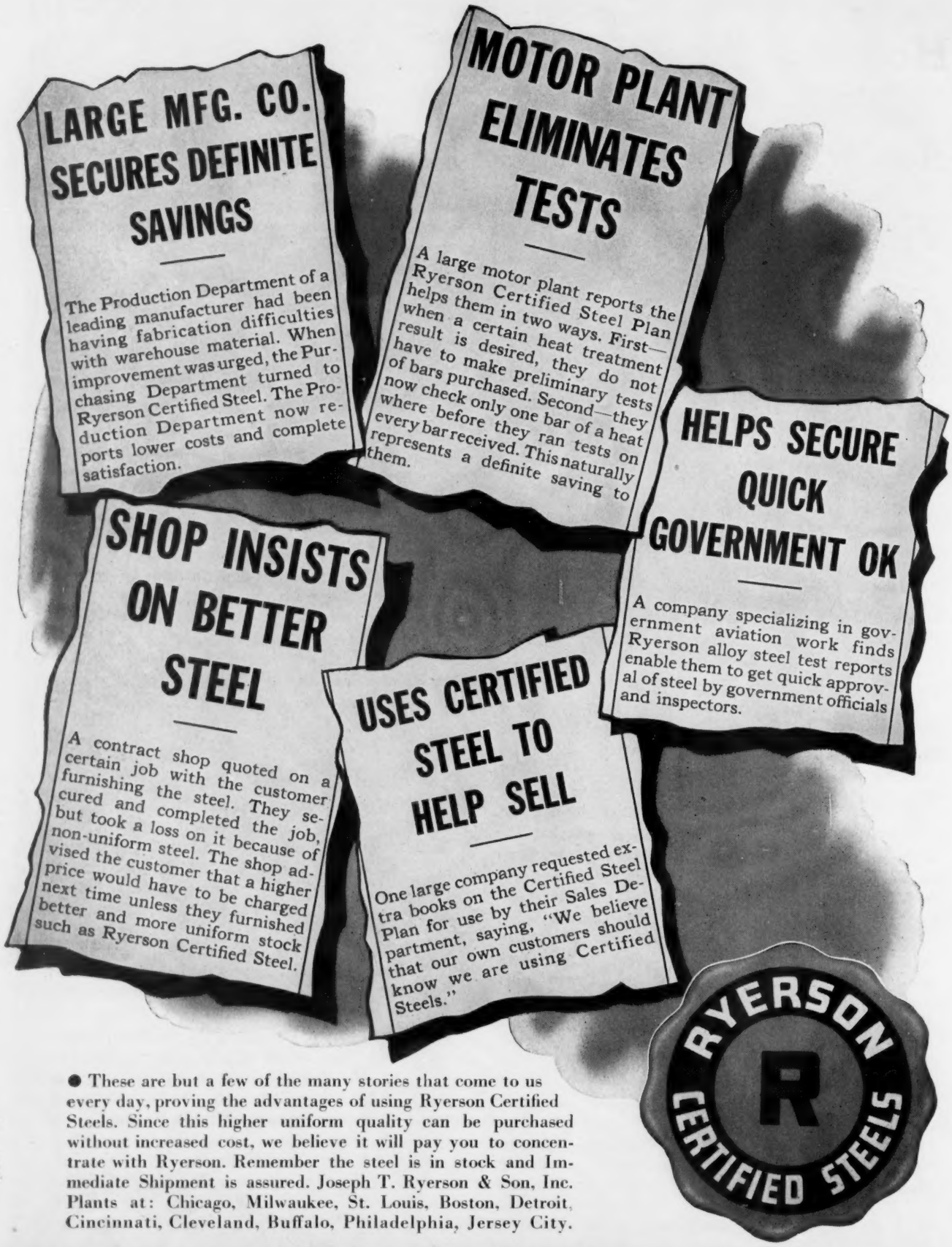
Suggests Tax Revision

♦ ♦ ♦

A new self-centering screw (p. 41) is designed to withstand high heat, abrasion and corrosion. . . . Production costs at a truck and bus frame plant have been lowered by an efficient handling system which eliminates much hand labor; it was specially designed (p. 48) to handle steel meeting varying specifications. . . . Special fixtures aid greatly in obtaining full benefits (p. 52) with the automatic, shielded, carbon-arc method of welding. . . . Cleanability of finished metal surfaces is especially important on food preparation equipment. One maker (p. 54) employs baked enamel finishes, color and varnish coats, tinned surfaces and stainless steel. . . . Development of a method for easy removal of cores has enabled one company (p. 58) to cast large rolls hollow.

Production Costs Cut

E C Kreutzberg


LARGE MFG. CO. SECURES DEFINITE SAVINGS
The Production Department of a leading manufacturer had been having fabrication difficulties with warehouse material. When improvement was urged, the Purchasing Department turned to Ryerson Certified Steel. The Production Department now reports lower costs and complete satisfaction.
MOTOR PLANT ELIMINATES TESTS
A large motor plant reports the Ryerson Certified Steel Plan helps them in two ways. First—when a certain heat treatment result is desired, they do not have to make preliminary tests of bars purchased. Second—they now check only one bar of a heat where before they ran tests on every bar received. This naturally represents a definite saving to them.
HELPS SECURE QUICK GOVERNMENT OK
A company specializing in government aviation work finds Ryerson alloy steel test reports enable them to get quick approval of steel by government officials and inspectors.
SHOP INSISTS ON BETTER STEEL
A contract shop quoted on a certain job with the customer furnishing the steel. They secured and completed the job, but took a loss on it because of non-uniform steel. The shop advised the customer that a higher price would have to be charged next time unless they furnished better and more uniform stock such as Ryerson Certified Steel.
USES CERTIFIED STEEL TO HELP SELL
One large company requested extra books on the Certified Steel Plan for use by their Sales Department, saying, "We believe that our own customers should know we are using Certified Steels."
RYERSON
R
CERTIFIED STEELS

● These are but a few of the many stories that come to us every day, proving the advantages of using Ryerson Certified Steels. Since this higher uniform quality can be purchased without increased cost, we believe it will pay you to concentrate with Ryerson. Remember the steel is in stock and Immediate Shipment is assured. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Boston, Detroit, Cincinnati, Cleveland, Buffalo, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

Holding Our World Trade Against Foreign Threats

Barter agreements, unusual concessions, pressure methods by totalitarian powers give rise to current trade "scare"—Prospects for U. S. exporters — in Latin America — in the Orient — in Europe

NEW YORK

■ EXECUTIVES of companies in the metal producing and working industries which depend to a considerable extent on foreign sales are inclined to believe the importance of the United States in world trade will tend to increase rather than diminish. Many bluntly declare the "scare" over threats of invasion of American foreign markets by totalitarian nations is grossly exaggerated.

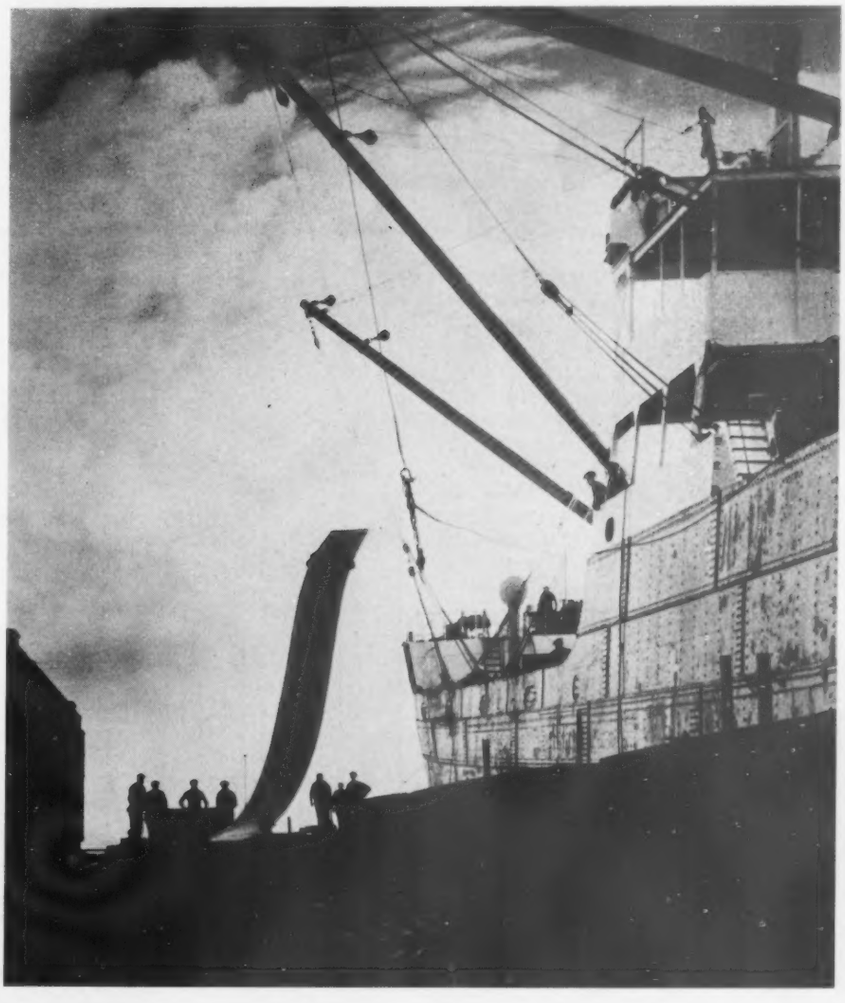
In fact, it is expected exports of some products in 1939, especially those needed for rearmament purposes, will hit the highest levels in more than a decade. Others will establish all-time records. One of these is the aircraft industry which looks for an increase of 60 per cent in foreign business as compared with 1938, which in turn registered nearly a 100 per cent increase over 1937.

The machine tool trade expects the best export business in years. Substantial increases also are seen in foreign sales of mass production goods, such as automobiles, radios and refrigerators. Movement of iron and steel also is expected to recover most of the 35 per cent loss sustained in 1938.

Last week, Secretary of State Cordell Hull returned from the Pan-American conference at Lima, Peru, with an optimistic report on prospects for trade with Latin America.

Said Mr. Hull: "All of the delegates at Lima with whom I had contact were vividly aware of the economic chaos existing in considerable parts of the world. They realized that this chaos would eventually involve their own countries unless preventive measures were taken. Accordingly, the American republics reaffirmed their judgment that a liberal trade policy without excessive restrictions and permitting trade to move along lines of economic advantage and equality was the soundest policy for all, and they renewed their support of this policy.

"This action was taken in the knowledge that trade arrangements of other kinds in the long run weaken the position of primary producers, curtail world markets, lessen economic benefit and may under some circumstances be used as an instrument of political influence or



■ **Loading steel for export at Bethlehem Steel Co.'s Sparrows Point, Md., plant**

domination. It was recognized too that this liberal policy was the only one proper to a peaceful trading world, rather than one of the competing and force-using alliances."

Despite the placid picture of the Lima conference painted by Mr. Hull, exporters are fully aware prospects for business abroad today probably are enmeshed in more political uncertainties than at any other time in history. However, it is firmly believed the efforts of Mr. Hull, in the long run, will be amply rewarded as indicated by the success of the 20 reciprocal trade treaties already in effect. Negotiations now are under way with Venezuela and Turkey, and Peru has announced interest in a reciprocal pact.

There is no doubt the system of barter agreements will be of some benefit to Germany, Italy and other totalitarian nations but it is believed that type of trade has definite limitations. Germany, Italy and Japan are displaying a strong front, but are regarded financially and economically unsound. All are short on raw materials and have little or no credit. Barter transactions already completed, moreover, have tended to discredit, even destroy, that method of trade. Countries party to bilateral agreements with Germany, for instance, have encountered irritating delays in delivery of the manufactured goods they were to receive in return for raw materials. It has been a not uncommon experience for the country bartering raw products to find the bartered products being offered competitively in the export markets in which the raw material producing country normally sells.

Limitations of the bilateral barter arrangement have forced signatory countries to accept manufactured products it does not need, nor particularly desire. For example, Germany bought Rumanian wheat, Yugoslav timber and Greek tobacco, and built up large frozen balances owed those countries. To liquidate those balances, Rumania had to accept thousands of typewriters, Greece took hundreds of thousands of mouth organs, Yugoslavia was given huge quantities of aspirin.

Boycott Hurts

Also, Germany and Italy have been severely hit by the boycott resulting from anti-Jewish policies. German exports in December are reported to have dropped well below even the shrunken November volume, and German firms have been asked to press for export business at all costs to bolster up foreign credits, even at the sacrifice of sidetracking armament orders.

Germany's plight is well illustrated by the situation in coffee. Last week, the coffee ration was cut in half, to two ounces per purchase, although Germany has a barter agreement with Brazil, which has a coffee surplus. Average quality coffee sells for $1.20 per pound, or about five times the price here.

In contrast, the leading democracies, especially the United States and England, are unquestionably the richest and most economically sound nations on the earth. These two nations control by far the largest share of monetary gold available and have abundant raw materials. France is by no means the second-rate nation many have termed her in face of Germany aggressiveness.

The answer to any economic problem in the long run and despite temporary artificial measures, lies in the control of raw materials—and the United States and Great Britain alone control 75 per cent of the world's mineral resources. Russia and France also have substantial holdings. Germany, on the other hand, can supply only about 40 per cent of her iron ore requirements, Italy 20 per cent and Japan 35 per cent.

Fascintern Bid for Markets

The totalitarian nations are not indifferent to trade opportunities in Latin America for they need her grain, beef, cotton, rubber, metals, nitrates and other commodities. Germany has signed barter agreements with several Latin countries and is expected to sign more. Italy already is reaping benefits from her trade treaty with Uruguay.

Last week, Yoshiata Hatta, new Japanese minister of commerce, announced plans to intensify the drive for Latin-American markets. Twenty-six trade assistance offices will be established throughout the world, four in South America.

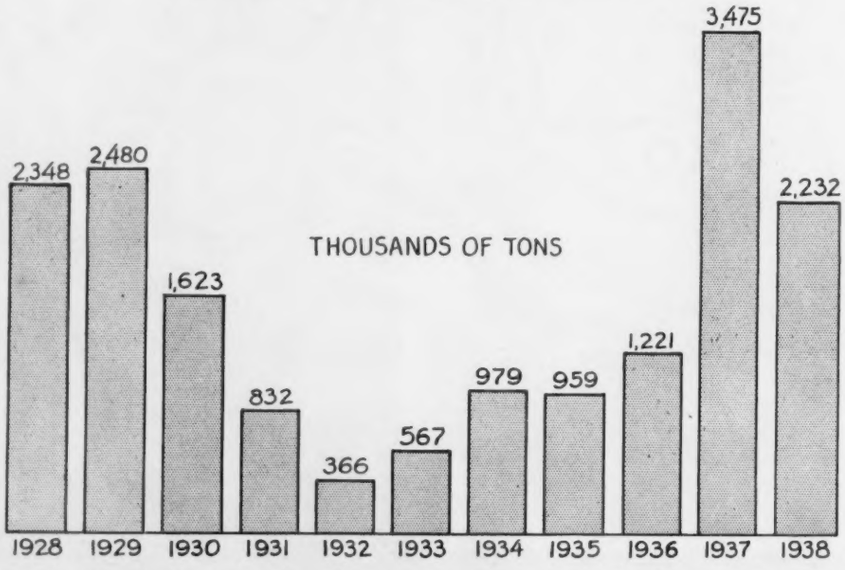
However, Germany apparently believes her most opportune interests lie to the Eastward rather than in the Americas. Already, her influence dominates the affairs of most central European nations, which require many of her manufactured products in exchange for agricultural and mineral products.

The German press has toned down its denunciations of the Soviets indicating Germany finds Russia may serve more useful purposes. German spokesmen will say frankly Russia is no longer feared. Of course, Germany also is looking confidently for the restoration of pre-war colonial possessions.

Italy's trade with Germany is increasing steadily, which is tending to offset the decline in business with France and England. The Italian agreement with England has been instrumental in increasing British exports to Italy. The reverse has not been true, however, and this subject was scheduled for discussion on Chamberlain's visit to Rome last week. Italy also has new trade agreements with Denmark and Rumania but negotiations with Russia and France so far have been unsuccessful. From the standpoint of colonies, Italy is more fortunate than Germany in that she has Ethiopia and others.

If Manchukuo represents a prece-

Steel Exports: Study in Recovery



■ **Exports of iron and steel products, excluding scrap, in 1938 were 2,232,780 gross tons, December estimated. Although this represents a 35 per cent decrease from 1937, it is well above the average for the preceding ten years, almost equals the pre-depression years, 1928 and 1929**

dent—and many believe it does—western nations, with possible exception of Germany and Italy, may expect business with China to dwindle to comparative insignificance. The present Chinese government is accorded little chance for success in the contest with Japan. Rehabilitation and expansion of China may result in a large amount of business for American iron and steel companies and makers of machinery and equipment for a time. Manchukuo took a substantial tonnage of steel in 1937 and the early part of 1938 but none since August.

Some evidence that Japan might keep China's door partly open was seen in the action last week to reopen the Hongkew and Yangtzepoo areas in Shanghai, the principal industrial and shipping sections.

Argentine Trade Analyzed

The position of the United States in South American trade may be illustrated by examining the foreign trade of Argentina. This country had exports of 2,165,742,000 pesos in the first 11 months of 1937, of which 28.4 per cent was to Great Britain, 13.2 per cent to the United States and 6.6 per cent to Germany. In the first 11 months of 1938, Great Britain took 31.3 per cent of the 1,271,154,000 peso total, while the United States took only 7.6 per cent and Germany 11.9. At the same time Argentina bought relatively more from the United States in 1938 than it did in 1937, as indicated by the following comparative figures:

ARGENTINE FOREIGN TRADE

	Imports (pesos)	Exports (pesos)
Jan.-Nov., 1937	1,413,947,000	2,165,742,000
Jan.-Nov., 1938	1,325,990,000	1,271,154,000

	Percentage Imported from		Percentage Exported to	
	1937	1938	1937	1938
Great Britain	19.0	18.3	28.4	31.3
U. S. A.	16.5	17.9	13.2	7.6
Germany	10.4	10.1	6.6	11.9
Italy	5.5	5.8	6.5	2.5
Belgium	6.3	5.1	9.4	6.7
Brazil	4.2	4.7	5.6	7.3
Peru	2.6	4.4	0.6	0.9
France	3.9	4.2	4.1	5.1
India	3.7	4.2	....	....
Dutch Possessions	2.9	3.7	....	....
Japan	3.3	3.2	1.1	1.1
Netherlands	3.2	1.9	9.5	6.2
Sweden	1.8	1.4	1.3	1.7
Czechoslovakia	1.2	1.3	0.9	1.3
Poland	1.2	1.2	0.7	1.2

Lack of available exchange is hampering business with a number of South American countries. Exchange transactions therefore are closely controlled by several governments but most American companies with long experience in South America believe that it will be possible to eventually work out of present exchange difficulties.

It is likely that the United States itself will step into the Latin American picture. Approximately $1,356,000,000 of the $1,593,000,000 in Latin American government bonds held in this country are in default and it is indicated that some adjustment will be made coincidental with making additional large loans for trade promotion purposes. The treasury department has made a special arrangement for supplying gold to Brazil and it is rumored that some of our excess gold holdings may be re-distributed to other nations. Loans probably would be negotiated through the Export-Import bank whose president, Warren Lee Pierson, has been visiting Latin America.

An examination of the accompanying chart shows how iron and steel exports have varied since 1928. Although 1938 volume was down about 35 per cent from 1937, it came close to equaling the totals for the pre-depression years, 1929 and 1928.

Part of the large volume of foreign business in both 1937 and 1938, of course, was due to the shortage of steel in Europe due to the rearmament race. Great Britain was one of the largest buyers, mostly of pig iron and semifinished, and since midsummer has been practically out of the market except for sheets and strip.

Despite the expected absence of British purchases here, prospects for American steelmakers in Europe are not completely blighted. Dutch shipbuilders have continued to favor American platemakers and Scandinavian yards also have contributed considerable plate tonnage. Russia is likely to continue as a fairly steady customer for sheets and strip and relief of credit restrictions in Greece and Turkey promise to open up more business.

Japan To Continue To Buy

Prospects for business in Africa have been dampened somewhat through the application of a freight dumping duty on rounds under 3 inches, including reinforcing bars, plates of specified dimensions and flat and corrugated galvanized sheets. To compete for South African business it would be necessary to quote plates at around 1.55c, f.a.s., it is said. Egypt and Mozambique are contributing a fair tonnage, mostly in flat-rolled products.

Most of Japan's purchases have been in pig iron and billets, and to a lesser extent in plates, sheets and bars. Continued substantial buying is anticipated for at least the first six months of 1939 inasmuch as it is known substantial scrap purchases will be made during this period. The tendency probably will be more in the direction of finished products, however.

The Philippine Islands provide the most diversified market for steel in the Far East with the tonnage items including bars, plates, shapes, sheets and tin plate. American companies are competitively strong in this market. Prospects are fairly bright, also, in other sections of the Far East, including Australia, New Zealand, Malaya, Netherlands East Indies and India. Most of the demand is for plates, sheets and wire.

Viewing the foreign steel marts as a whole, it is believed that under equal competitive conditions, American producers can obtain at least their proportionate share. Foreign buyers have come to appreciate the merits of open-hearth steel against European products, which would be classed as Bessemer steel here. Buyers also have come to appreciate better finishes, especially on sheets and tin plate. Only recently, a number of Welsh tin plate mills decided to band together for the purpose of meeting competition in the home market of a new cold reduction mill in Wales and American mills abroad.

The following table shows percentage export sales in leading markets:

PRINCIPAL STEEL EXPORT MARKETS

(Expressed in percentages. Figures for 1938 partially estimated)

	1938	1937	1929
Japan	23.0	23.0	9.0
Canada	11.0	13.0	49.0
United Kingdom	7.0	12.0	2.0
Kwantung	5.0	3.0	1.0
Philippine Islands	4.5	3.0	4.0
Venezuela	4.0	2.0	3.0
Netherlands	4.0	1.5	0.1
Columbia	4.0	1.7	1.5
Brazil	3.3	3.0	3.0
U. S. S. R.	3.0	3.0	0.7
Chile	2.5	1.0	1.5
Mexico	2.0	4.0	4.0
Sweden	1.0	3.0	0.1
China	1.0	4.0	1.0
Others	24.7	23.8	20.1
Total	100.0	100.0	100.0

According to preliminary estimates, 1938 was the best export year on record for builders of industrial machinery. Both Russia and Japan have been heavy purchasers and the United Kingdom continues as one of the principal markets. France also has been a factor. In November, as an example, Russia took nearly $500,000 in lathes, Japan $350,000, United Kingdom and France each $100,000. Relatively important, also, were purchases by Italy, Sweden, Canada, Brazil, China and The Netherlands. Sales of other equipment for rearmament plants, including boring and chucking machines, millers, gear cutters, also were important. Metalworking machinery is showing the most promise.

Exports of munitions as such have been comparatively small. For instance, November witnessed no shipments of machine and heavy ordnance guns or shells and movement of small arms and cartridges was small.

Aviation constitutes one of Amer-

(*Please turn to Page* 84)

Recent Trends in Steel Analyzed at Scrap Institute's Convention

■ CHANGING trends in the iron and steel scrap industry, competitive practices and promotion of a safety program featured discussions at the eleventh annual convention of the Institute of Scrap Iron and Steel Inc. at Hotel Jefferson, St. Louis, Jan. 10-12.

More than 400 scrap dealers and brokers from all parts of the country were in attendance, the meeting being described by officials of the institute as one of the largest ever held.

Speaking on the trend toward lighter grades of scrap, Edwin C. Barringer, executive secretary of the institute, pointed out, in scrap probably more than in any other industry, coming events cast their shadows before them. He said because the industry deals in waste from the processes of manufacture it cannot influence the material in which it deals, but by watching what comes off the cooling beds of rolling mills it can accurately gage for the long pull any change in the kind of scrap into which steel products ultimate.

Mr. Barringer declared an important change is in process right now, this being indicated by the revolution in the character of the products of the steel industry. He said dominance is passing from heavy steel products to the light flat-rolled lines and while the effect is not yet fully reflected in the scrap market, nevertheless already the proportion of light grades of materials is increasing measurably.

Ratio of Light Products Gaining

"In 1928, only a decade ago," said Mr. Barringer, "less than half the output of finished rolled steel, or 46 per cent, was in the category of what we broadly term light products. In 1929 or 1930 the percentage of light products eased off fractionally to 45 but in 1931, the first year in which the depression hit hard, the percentage of light steel products jumped to 51 per cent. In 1932 the percentage of light steel products, and hence of the ancestors of light scrap, soared to 58, and in 1933 to 63. Since then, the percentage of light products has varied between 58 and 62, being 58 in the first nine months of the year just closed.

"To recapitulate, today the rolling mills are devoted 58 per cent to the production of the lighter forms of steel, whereas only a decade ago this percentage was merely 45. To express it another way, the increase in the proportion of light steel production in a decade has been 30 per cent.

"It is obvious the scrap trade is only a processor and its function is to prepare and market the kind of scrap that obsolescence and replacement make available. Hence this transition in the classification of scrap is also a major problem for the producers of steel, and an adaption of their operations for continued economical use of scrap will be seen to be increasingly necessary."

William H. Colvin Jr., president, Rotary Electric Steel Co., Detroit, speaking on "A Steel Executive Looks At His Business," discussed the economic situation.

Joseph E. Jacobson
Elected president, Institute of Scrap Iron & Steel Inc.

"The only possible answer to a combination of more people and less wealth is a lower average standard of living," said Mr. Colvin, "and that soon began to show up in one country after another in Europe, although not until the politicians everywhere resorted to the usual methods of delaying the whirlwind by sowing a hurricane through unbalanced budgets, deficit financing through central banks, paper money, and the general run of monkey business we are now growing familiar with over here."

Mr. Colvin pointed out the customer for the scrap industry's product and the source of its material must largely be the iron and steel industry; and that consequently the scrap industry has doubled the normal business interest in the good health and frame of mind of its customer.

Because of the nature of the steel industry's physical plant, the expense of the organization to operate, and the small profit per unit produced, he said, a depression, on the way down, gives the steel industry almost no chance to avoid steady losses. The depression beginning in June, 1929, was no exception in the first couple of years, but quite an exception during the next couple.

By 1933, the industry was ready to accept recovery at anybody's price —no profit over a period which from its beginning now equals about a fourth of the average fellow's working life time. The steel industry, in common with many others, bumped into a new philosophy— the policy of scarcity.

"This policy of scarcity," said Mr. Colvin, "is new to the United States. However, it actually is so old that many have forgotten it and its unbroken record of failure wherever it has been tried throughout history."

Mr. Colvin concluded by stating that some clear thinking, free from propaganda, may cut through the smoke screen and bring nearer the time when able men can again help the lot of all by encouraging them to help themselves. He said we should resurrect the incentive which makes men and capital go to work, seek for sound levels of values at which lender and borrower can safely do business together, encourage reserves for obsolescence and bad times, be respectful to thrift, and finally, cut out the paternalism which cannot be afforded by a nation or a people already living on its capital.

Says "Put House in Order"

S. H. Bassow, Bassow Bros., New York, in a paper on "Suggested Revision of Competitive Practices" declared basically unsound policies practiced by any part of the industry will react unfavorably on all concerned in that industry. He urged the scrap industry put its house in order and develop a group strong enough to keep all dealers in line. He suggested appointment of an impartial chairman who, with the aid of a committee, can review and interpret infractions of good business practices.

In his annual report, Michael V. Bonomo, president of the institute and treasurer of the Schiavone-Bonomo Corp., New York, reviewed the work of the past year and pointed out the opportunities for further progress which can be made over coming months. Further, the social responsibility of the industry was stressed.

The scrap iron industry, said Joseph Colvin, secretary, Scrap Materials Service Corp., New York, is overlooking its best bet in the campaign for reducing its operating costs through neglecting to aggressively promote a safety campaign

thus reducing compensation insurance cost.

"Characterized by a state of apathy and a general indifference to the problem," said Mr. Colvin, "the attitude of the industry in the past may be well described in the oft expressed sentiment of those scrap dealers who have said, 'Let the insurance company pay; that's what I am paying a premium for.' That this philosophy has not only been false but a costly boomerang as well has been clearly demonstrated in the prevailing exorbitant compensation rates."

A progress report on the scrap baling industry was presented by S. H. Bassow, Bassow Bros., New York, in which it was suggested a Scrap Balers' association be organized with the definite objective of promoting sound practices in baling, special emphasis being placed on No. 2 bundles.

"Industry's Opportunity"

"Industry's Opportunity and Responsibility" was the subject of a paper by Louis J. Borinstein, A. Borinstein, Indianapolis. This paper in considerable detail discussed the need of acquainting the public with the problems of business in a move to forestall additional adverse legislation and to correct laws, both federal and state, now on the books.

Chapter reports were presented by the following: For the Southern chapter, Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va.; Seaboard chapter, Marvin S. Plant, H. Klaff & Co. Inc., Baltimore; St. Louis chapter, Harry J. Kiener, Hickman, Williams & Co., St. Louis; Philadelphia chapter, John F. Malloy, Malloy & Schreiner, Philadelphia; Northwest chapter, Sol H. Rosen, Union Scrap Iron & Metal Co. Inc., Minneapolis; New Jersey chapter, B. H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J.; Northern Ohio chapter, Ed Stein, United Iron & Metal Co., Canton, O.; Capital district chapter, Harry W. Symansky, Atlantic Steel Corp., Albany, N. Y.; and the Boston chapter, Morris Kafker, Luria Bros. & Co. Inc., Boston.

Of particular importance to the delegates was the announcement at the meeting that advices had been received that railroads in Missouri, Iowa, Kansas, Nebraska, Minnesota, and Wisconsin have adopted, to become effective March 1, complicated and expensive loading rules for scrap iron which will increase the freight rates over 80 per cent on any shipment not loaded according to these rules. It was said similar rules will no doubt be adopted in Texas and Oklahoma. This matter was discussed at a luncheon meeting Wednesday, Jan. 11, the discussion being led by R. K. Keas, traffic manager of the Laclede Steel Co.

Closing the business sessions of the convention Thursday, announcement was made of the election of Joseph E. Jacobson, Luria Bros., Pittsburgh, as the new president of the institute, succeeding Michael V. Bonomo, Schiavone-Bonomo Corp., New York. Louis Borinstein, Indianapolis, was elected vice president; George E. Sturm, Middletown Iron & Steel Co., Middletown, O., secretary; and Thomas F. Kelly, New York, was re-elected treasurer.

Directors-at-large were elected as follows: Benjamin Schwartz, Schiavone-Bonomo Corp.; Darwin Luntz, Luntz Iron & Steel Co., Canton, O.; Phil Frieder, Phil Frieder Co., Cleveland; Charles D. Dreifus Jr., New York; William Ross, Chicago; Frank Gordon, Boston; Alvin Wolff, Wolff Pipe & Iron Co., St. Louis; Harry Grant, Grant Iron & Metal Co., Detroit; and Edward L. Solomon, Max Solomon & Co., Pittsburgh.

Pittsburgh was selected for the 1940 convention.

December Machine Tool Orders Highest in 1938

■ Machine tool orders in December were the best for any month last year and exceeded those for December, 1937. National Machine Tool Builders' association's index rose to 146.5 from 112.2 in November. Previous 1938 high was in August, 120.9. In December, 1937, the index stood at 142.7.

Domestic volume continued on the uptrend in December. Three months' average reflected the monthly gain, rising to 125.6 from 115.9 in November.

Transportation Bill Hearings Start Jan. 17

■ Representative Lea, California, chairman, house committee on interstate and foreign commerce, last Friday introduced an omnibus bill designed to improve the transportation situation.

Hearings will start before his committee Jan. 17, with Walter M. W. Splawn of the interstate commerce commission as first witness. At the conclusion of the Splawn statement, committee will adjourn until Jan. 24.

■ Bellanca Aircraft Corp., New Castle, Del., has contracted to build for the Chinese government 200 fighting planes estimated to cost $8,300,000.

■ **Opening general session, eleventh annual convention, Institute of Scrap Iron and Steel Inc., St. Louis, Jan. 10-12**

FINANCIAL

CLEVELAND-CLIFFS TO SUBMIT REFUNDING PLAN

■ A PLAN for refunding the Cleveland-Cliffs Iron Co.'s $13,230,000 4¾ per cent bonds has been approved by directors and will be submitted to stockholders Feb. 2.

This contemplates redemption of present bonds March 15, at 105. Funds will be provided by the sale of $11,500,000 principal amount of first mortgage and collateral trust 3½ per cent bonds dated Feb. 1, 1939, and due Feb. 1, 1951, with $2,500,000 principal amount of serial notes maturing $500,000 annually through Feb. 1, 1944. The serial notes are to carry interest at rates varying from 1½ per cent for first maturity to 2½ per cent for fifth maturity. The $14,000,000 received by the company through sale of the bonds and notes at par will retire the present issue including redemption premium of 5 per cent and expenses of financing. No new funds will be realized.

♦

A. M. Byers Co., Pittsburgh, reports for the fiscal year ended Sept. 30, 1938, a net loss of $606,760, compared with net profit of $93,223 in the preceding year. The balance sheet as of Sept. 30 shows current assets $2,787,721 and current liabilities $373,551.

♦

Continental Can Co. Inc., New York, has declared the first quarter interim dividend of 50 cents a share on common stock, payable Feb. 15 to holders of record Jan. 25.

♦

Earnings of Arthur G. McKee Co., Cleveland, were reported in a letter sent recently to stockholders as equal to $7.35 a share on the class B common stock for 1938. Contracts booked by the company since Nov. 1 were as large as those for the entire 10-month period preceding that date. The dollar volume of foreign business during 1938 amounted to 91 per cent of the company's total business for the year.

♦

Great Northern Iron Ore Properties, St. Paul, has authorized distribution of 75 cents per certificate of beneficial interest, payable Jan. 31 of record Jan. 16. The company paid 75 cents Jan. 31, 1938, 50 cents Dec. 20.

Security Tax Refund Given on Federal Work

■ Glenn L. Martin Co., Baltimore, manufacturer of airplanes, has been held entitled to recover $7737.32 from the government, under a decision of the United States circuit court of appeals for the fourth circuit.

This represents social security taxes paid the United States and state of Maryland in 1936 and 1937 on labor employed on a government contract. The latter provided that taxes imposed subsequent to its signing could be recovered. The claim was disallowed by the district court of the United States for the district of Maryland but on appeal this was reversed.

The decision establishes a precedent with respect to recovery from the United States of federal and state social security taxes paid on labor engaged in government contracts under similar circumstances.

LABOR

INDEPENDENT UNIONS FAVOR WAGNER ACT REVISION

■ SIX specific changes in the national labor relations act were recommended by delegates to the annual conference, Central Council of Steel Plants of the Republic Steel Corp. in Cleveland last week. The central council co-ordinates activities of the independent labor organizations in Republic plants.

Wagner act changes proposed: Development of a federal registry for all unions similar to the British registry of trade unions.

Prohibition of all strikes involving interstate commerce.

Granting of equal collective bargaining rights to both minorities and majorities.

Permission to employers to file complaints with the labor board.

Prohibition of "unfair labor practices" by labor unions.

Provision for review and adjudication of labor board decisions by federal district courts, rather than federal appellate courts.

INDUSTRIAL CO-OPERATION; "AN OLD AMERICAN CUSTOM"

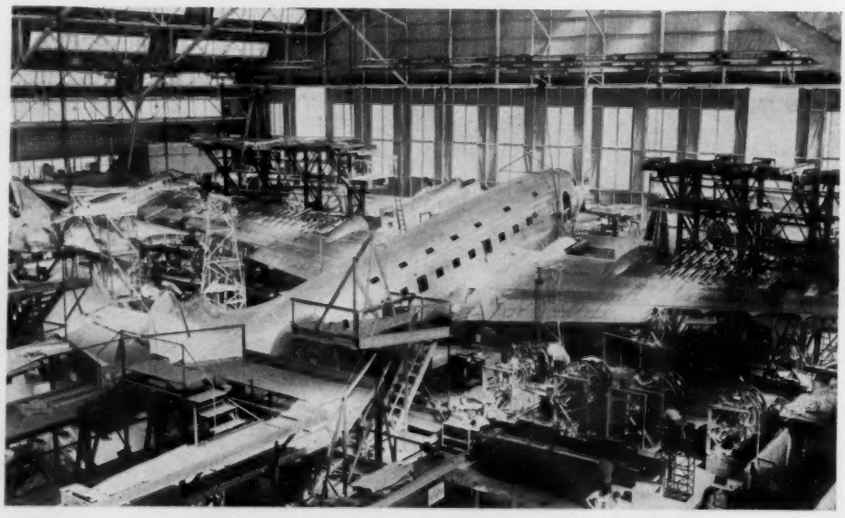
"Let's All Work Together—It's an Old American Custom," slogan sponsored by National Association of Manufacturers, will appear during January on 15,000 poster panels in all cities and towns over 2500 in population. Other posters with the same theme will be displayed in February and March. Outdoor Advertising Association of America has donated the space. Similar displays were in 1936 and 1937.

The poster campaign follows up the keynote for industry adopted in December at the Congress of American Industry, at which a call was made for a concerted drive for renewed prosperity.

WESTINGHOUSE RESTORES CUTS IN LOWER SALARIES

Salary restorations affecting about 5000 employes have been announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. All salaried employes who were receiving $125 or less before the 10 per cent reduction last June 1 will be restored to their former rates. The action affects more than a third of salaried workers.

Test Planes for Flight Stresses, in Crowded Factory



■ **In Douglas Aircraft Co.'s Santa Monica, Calif., plant, airplanes are tested for flight stresses without leaving the ground. Shown during such an "indoor flight" is company's giant sky-liner, the all-metal, 42-passenger DC-4. Equipment used in the tests includes 500 tons of lead loading bars and 88 tons of structural steel**

Steel Founders' Society Elects New Officers

■ Frank M. Robbins, president, Ross-Meehan Foundries, Chattanooga, Tenn., was elected president of the Steel Founders' Society of America, Cleveland, at the newly-elected board of directors' organization meeting in that city, Jan. 11. Col. Merrill G. Baker was reappointed executive vice president; and Raymond L. Collier was continued as secretary-treasurer.

Members of the new board of directors for 1939-40, with the divisions they represent, are as follows: No. 1, A. J. McDonald, Lebanon Steel Foundry, Lebanon, Pa.; No. 2, E. J. Mohr, Symington-Gould Corp., Rochester, N. Y.; No. 3, T. H. Shartle, Texas Electric Steel Casting Co., Houston, Tex.; No. 4, D. C. Bakewell, Blaw-Knox Co., Pittsburgh; No. 5, A. H. Anthony, Massillon Steel Castings Co., Massillon, O.; No. 6, A. K. Reading, Zimmerman Steel Co., Bettendorf, Iowa; No. 7, Burtner Fleeger, Oklahoma Steel Castings Co., Tulsa, Okla.; and No. 8, J. P. Arnoldy, Warman Steel Casting Co., Los Angeles.

Frank M. Robbins

Mr. Reading and Mr. McDonald were elected members of the executive committee of which President Robbins is chairman. Chauncey Belknap, Curtis, Belknap & Webb, New York, was reappointed legal counsel.

The board endorsed a continuation of the society's advertising program. It also established a memorial medal, in honor of the late Frederick A. Lorenz Jr., a former president of the society, to be awarded each year to the individual contributing the most meritorious service to the industry during the year. First award is to be made at the society's annual meeting at the Edgewater Beach hotel, Chicago, Feb. 8-9.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Jan. 14	Change	Same week 1938	Same week 1937
Pittsburgh ...	44	None	34.5	80
Chicago	49	— 4	26.5	77
Eastern Pa....	34	None	31	53
Youngstown..	55	+ 5	25	77
Wheeling	64	None	35	94
Cleveland ...	56.5	+ 2.5	24	80
Buffalo	44	None	23	84
Birmingham..	77	None	63	76
New England.	75	+ 5	26	88
Cincinnati ...	65	— 7	28	92
St. Louis.....	40	— 5.5	21	80
Detroit	87	— 4	52	95
Average....	52	+ 0.5	29	79

Holds for Railroads; Bars Truck Competition

■ Uncurbed motor truck operations are working a hardship on the railroads, and causing traffic problems, declared Judge Arthur E. Fisher in circuit court at Rockford, Ill., last week.

He vacated a certificate given Keeshin Freight Lines Inc., a trucking concern, by Illinois commerce commission, to operate between Chicago, Rock Island and northern points.

The decision upheld several railroads in their contention that they have a prior claim to hauling the freight, and that trucks should be barred from the highways, as unnecessary competitors. The case is expected to be appealed.

U. S. Steel's Shipments 51 Per Cent of 1937

■ Shipments of finished steel by the United States Steel Corp. in December totaled 694,204 tons, 14,551 tons more than in November, and 205,134 tons over December, 1937.

Shipments in 1938, without year-end adjustment, were 6,625,368 tons, 51 per cent of the 1937 total, 12,748,354 tons. This compares with 10,784,273 tons in 1936 and 7,347,549 tons in 1935.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1938	1937	1936	1935
Jan.	518,322	1,149,918	721,414	534,055
Feb.	474,723	1,133,724	676,315	583,137
Mar.	572,199	1,414,399	783,552	668,056
April	501,972	1,343,644	979,907	591,728
May	465,081	1,304,039	984,097	598,915
June	478,057	1,268,550	886,065	578,108
July	441,570	1,186,752	950,851	547,794
Aug.	558,634	1,107,858	923,703	624,497
Sept.	577,666	1,047,962	961,803	614,933
Oct.	663,287	792,310	1,007,417	686,741
Nov.	679,653	587,241	882,643	681,830
Dec.	694,204	489,070	1,067,365	661,515
Y'rly adj.		†77,113	†40,859	†23,750
Total	6,625,368	12,748,354	10,784,273	7,347,549

†Deduction.

PRODUCTION

■ STEELWORKS operations last week advanced in three centers, declined in four and remained stationary in five. The national rate is estimated at 52 per cent, half a point higher than the preceding week.

Youngstown, O.—Gained 5 points to 55 per cent, 48 open hearths and three bessemers active. Schedules for this week indicate a decline of about 3 points as Sharon Steel Corp. drops one open hearth and Youngstown Sheet & Tube Co. shuts down its bessemer.

Cleveland—Advanced 2.5 points to 56.5 per cent as Otis Steel Co. added an open hearth.

Chicago—Curtailment by two interests caused 4 points drop to 49 per cent, larger operations by two smaller mills compensating only partially. Carnegie-Illinois Steel Corp. has banked a blast furnace at Gary and one at South Chicago. Inland Steel Co. is blowing four of its five blast furnaces.

Cincinnati—With shipments equal to new bookings the rate has receded 7 points to 65 per cent.

St. Louis—Declined 5.5 points to 40 per cent, with 13 open hearths in production.

Birmingham, Ala.—Unchanged at 77 per cent, 17 open hearths being active.

Central eastern seaboard—Held at 34 per cent, although two plants are curtailing activity slightly.

New England—Up 5 points to 75 per cent, one steelworks operating all its open hearths.

Pittsburgh — Readjustment of rates by several mills left the rate unchanged at 44 per cent. McKeesport Tin Plate Co. has resumed production after two weeks holiday shutdown. Carnegie-Illinois Steel Corp. has blown in its largest blast furnace at Clairton works, giving it 14 active in the Pittsburgh district.

Wheeling—Unchanged at 64 per cent.

Detroit—Down 4 points to 87 per cent, 22 of 25 open hearths operating. Ford is producing 15,000 tons per week and expects to hold this rate. Great Lakes has 14 of 16 open hearths in service.

Buffalo—Continues at 44 per cent, 19 open hearths melting.

■ International Harvester Co., Chicago, will spend about $5,000,000 in enlarging and modernizing its tractor works at Rock Island, Ill., and about $1,000,000 for completing a foundry at its new motor truck plant at Indianapolis.

MEN OF INDUSTRY

■ WILLIAM M. RECTOR, district sales manager at Rochester, N. Y., for Weirton Steel Co., Weirton, W. Va., has been appointed district sales manager in New York. W. E. Snellgrove, assistant district sales manager in New York, has been appointed district sales manager in Rochester.

♦

A. V. Martin has been appointed superintendent of steel provision, West mills, and J. Frank Frain, assistant superintendent of merchant bar mills, Gary works, Carnegie-Illinois Steel Corp. Mr. Martin's entire career has been with subsidiaries of the United States Steel Corp. at Gary, Ind. He joined American Sheet & Tin Plate Co.

A. V. Martin

in 1915, serving as load checker, finishing end foreman, and general office assistant. Mr. Frain joined National Tube Co. at Ellwood City, Pa., in 1922, subsequently becoming assistant superintendent of the pipe mill at Gary. In 1929 he left to become assistant plant manager, Lyon Metal Products Co., Aurora, Ill., where he spent four years before returning to the Gary works merchant mills. In 1934 he joined Babcock & Wilcox Tube Co., Beaver Falls, Pa., as general superintendent.

♦

Frank E. Graper has been named vice president and general manager, Acklin Stamping Co., Toledo, O.

♦

Carl R. Hesler has become sole owner of the Tri-City Steel & Supply Co., Moline, Ill., of which he has been president.

♦

S. C. Stampleman has resigned as president, Gillette Safety Razor Co., Boston, to become chairman of the board. He is succeeded as president by J. P. Spang Jr., who has been executive vice president since October of last year.

♦

Ray B. Hoover, formerly vice president and general manager, Shafer Bearing Corp., Chicago, manufacturer of roller bearings, has been elected president.

♦

F. G. Carrell, vice president and a director, Calumet Steel Co., Chicago, has been appointed general manager, Franklin Steel Works, Franklin, Pa.

♦

R. I. Petrie has been elected president and general manager, Barlow & Selig Mfg. Co., Ripon, Wis., succeeding R. C. Stuart, who has been elected chairman of the board. Mr. Petrie formerly was an executive of Kelvinator Corp., Detroit.

♦

G. H. Hedrick, formerly sales engineer, Thomas Spacing Machine Co., and the past ten years, chief engineer, Gem Mfg. Co., has been appointed chief engineer, muffler division, Maremont Automotive Products Inc., Chicago.

♦

C. William Rados has assumed the duties of manager, National Salesmen's institute, established by the Kelvinator division of Nash-Kelvinator Corp., Detroit, for the training of its salesmen. Sidney Edlund, sales educator, is president of the institute.

♦

Fred K. Frazer has been elected president, Frazer & Jones Co., Syracuse, N. Y., to succeed the late Fred Frazer. Mrs. Mary B. Frazer has been elected secretary and a director, while Martin W. Henley remains as vice president.

♦

Herbert E. Plishker, member of the advertising staff of the lamp division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa, more than 11 years, the past six as assistant advertising and sales promotion manager, has been appointed advertising and sales promotion manager.

♦

J. H. Critchett has been appointed a vice president, Electro Metallurgical Co., New York. He will continue as vice president, Union Carbide & Carbon Research Laboratories. F. B. Morgan has also been named a vice president of the Electro Metallurgical Co., and will continue his duties as works manager.

♦

Harry G. Bow, formerly manager of sales, Superior Sheet Steel Co., Louisville, O., has become manager of sheet sales, Reeves Steel & Mfg. Co., Dover, O. Before joining Superior Sheet Steel he was associated with the Berger Mfg. Co., Canton, O., as general manager of sales, and also held a similar position with Milwaukee Rolling Mill Co.

♦

Kinley D. Tracy has been appointed assistant sales manager, Baker Industrial Truck division, Baker-Raulang Co., Cleveland. He has been associated with the company the past five years, in charge of advertising and sales promotion.

♦

C. F. Reeves has been appointed manager, New York sales branch of the plastics division, Monsanto Chemical Co., St. Louis. F. A. Abbiati has been made sales manager of all Monsanto sheet plastics. S. A. Bell has been promoted from within the

J. Frank Frain

sales organization to assistant sales manager in charge of sheets, rods, and tubes, under Mr. Abbiati.

Sales of nitrocotton will be combined with the sales of Monsanto molding compounds, and W. W. Powers will be in charge of nitrocellulose sales.

♦

Meyer W. Singer, M. W. Singer & Co., Pittsburgh, has been elected president, Pittsburgh chapter, Institute of Scrap Iron and Steel Inc. Edward L. Solomon, Max Solomon Co., Pittsburgh, has been elected vice president; H. F. Stocker, H. F. Stocker & Co., Pittsburgh, re-elected secretary, and David L. Wilkoff, David L. Wilkoff Co., Pittsburgh, re-elected treasurer.

♦

Lawrence E. Scrannage, since 1934 operating superintendent, Cleveland Hardware & Forging Co., Cleveland, is establishing practice as a consulting and contracting engineer, with headquarters at 1658 Rydalmount road, Cleveland Heights, O. He has had wide experience in management, design and

plant operation. From 1929 to 1934, Mr. Scrannage was associated with Trundle Engineering Co., industrial and management engineers, Cleveland. He is a member, American Management association, Drop Forging association and National Foreman's institute.

♦

Neil C. Hurley Jr., associated with Independent Pneumatic Tool Co., Chicago, since 1932, the past four years as secretary, has been elected a vice president. He also has been active in the direction of sales for the company's electric tool division.

♦

Frank M. Blaurock, who has represented Andrews Steel Co., Newport, Ky., in the Chicago and Milwaukee districts the past 28 years, has resigned. Mr. Blaurock has opened an office in the McCormick building, Chicago. No announcement of his future plans has been made.

♦

James Plummer has retired as purchasing agent, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., after 48 years of service. The retirement will be effective at the expiration of an extended leave of absence which began Jan. 1. H. K. Peebles has been appointed acting purchasing agent.

♦

William C. Hood, the past year general superintendent, United States Coal & Coke Co., a United States Steel Corp. subsidiary, has been named general superintendent, H. C. Frick Coke Co., Pittsburgh, also a corporation affiliate. He succeeds Clay F. Lynch, resigned. Mr. Hood has been associated with the Frick and associated companies since 1897.

♦

L. H. Williams, Williams Hardware Co., Minneapolis, has been elected president, Northwest chapter, American Steel Warehouse association. Other officers elected include: Vice president, Joseph Paper, Paper, Calmenson & Co., St. Paul; secretary, Winter Dean, Nicols, Dean & Gregg, St. Paul. Mr. Williams will also serve as national director.

♦

George C. Brainard, president, General Fireproofing Co., Youngstown, O., has been appointed chairman of the board of directors and Federal Reserve agent of the Cleveland Federal Reserve bank for 1939. Mr. Brainard, who has spent his business life in the fabrication of steel and aluminum, became active in banking circles during the banking crisis of 1931 and was a member of the Ohio advisory banking committee and the committee for

Neil C. Hurley Jr.

industrial loans of the Federal Reserve. After a year on the Federal Reserve board he was reappointed in 1938 for a three-year term, serving as deputy chairman during that year.

♦

S. D. Yardley, formerly assistant district sales manager in the Houston, Tex., office of Republic Steel Corp., has been appointed assistant manager of sales, sheet and strip division, with office in Cleveland. During the World war he was a lieutenant in the United States navy and after leaving the service joined Gulf States Steel Co., which was merged with Republic.

♦

Morris Kafker, Boston manager for Luria Bros. & Co. Inc., has been elected president, Boston chapter, Institute of Scrap Iron and Steel Inc. David Borowsky, Jacob Borowsky, Fitchburg, Mass., has been re-elected first vice president; Frank B. Gordon, Harcon Corp., Chelsea, Mass., heretofore chairman of the executive committee, has been made second vice president; Ernst Hollander, Ernst Hollander Iron & Metal Corp., Chelsea, treasurer; Morris Cohen, Everett & Chelsea Iron & Steel Co., Everett, Mass., secretary.

DIED:

■ W. NELSON MAYHEW, 58, president, Montgomery Iron & Steel Co., Philadelphia, in that city, Jan. 2. He had been associated with the company 38 years.

♦

Alcide C. Demeules, 55, vice president, Demeules Bros. Wire & Iron Works, Minneapolis, in that city, recently.

♦

Andrew M. Morrison, 77, president, Morrison Bros. Co., Dubuque, Iowa, maker of oil storage tanks and equipment, in Dubuque, recently.

♦

W. L. Hitchcock Sr., 72, president, Portsmouth Refractories Co., Portsmouth, O., in that city, Dec. 30.

♦

George E. Scott, since 1929 president, American Steel Foundries, Chicago, in Chicago, Jan. 11.

♦

Frank J. Fertig, 69, Cleveland district manager, Grinnell Co., Providence, R. I., in Cleveland, Jan. 5.

♦

George Kessler, 43, tool engineer, Midland Steel Products Co., Cleveland, Jan. 8 in that city.

♦

James S. Bradshaw, 54, since 1923 assistant to the president, Globe Steel Tubes Co., Milwaukee, Jan. 3.

♦

Bernard E. Fahey, 52, well known as sales engineer in steel building materials, and vice president, Jackson & Fahey Co., Milwaukee, Jan. 3.

♦

Karl G. Sommer, 49, chief engineer, American-Marsh Pumps Inc., Battle Creek, Mich., in that city, recently.

♦

Leonardo Charla, 72, founder in 1888 of the Charla Iron Works, producer of ornamental iron, New Rochelle, N. Y., in that city, Jan. 4.

♦

James T. Fulton, 74, retired iron and steel merchant, in Chicago, Jan. 8. He formerly was with D. Kimbark & Co. and also with Paul & Fulton.

♦

Frank F. Jackson, 44, vice president and treasurer, Standard Alloy Co., Cleveland, Jan. 3 in Clearwater, Fla. He had been associated with the company 11 years.

♦

Samuel W. Meals, 69, since Nov. 1, 1921, president, Carnegie Natural Gas Co., Pittsburgh, a United States Steel Corp. subsidiary, in that city, recently.

♦

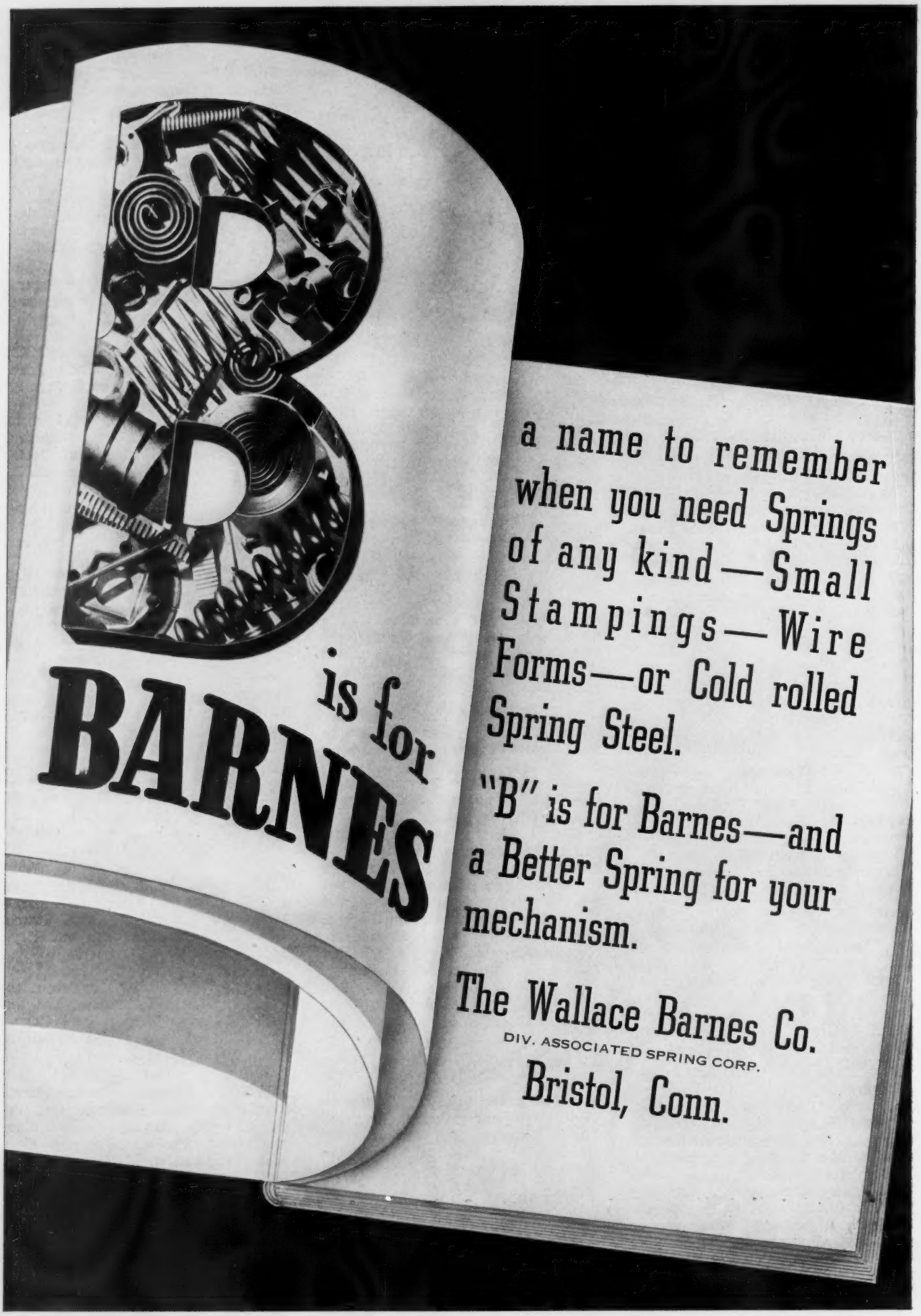
George W. Jahn, 64, assistant to chief engineer, Gary sheet and tin mills, Carnegie-Illinois Steel Corp., in Gary, Ind., Jan. 5. He had been with the corporation since 1904.

♦

William Gilbert, 79, president, Cincinnati Steel Castings Co., in Orlando, Fla., Jan. 8. He was also a director, Buckeye Foundry Co., and vice president, Dreses Machine Tool Co.

♦

Hosea Webster, 79, who retired in 1933 as general sales manager for Babcock & Wilcox Co., New York, Jan. 2 at his winter home in Coral Gables, Fla. He was an honorary member, American Society of Mechanical Engineers.


B
is for
BARNES
a name to remember when you need Springs of any kind—Small Stampings—Wire Forms—or Cold rolled Spring Steel.
"B" is for Barnes—and a Better Spring for your mechanism.
The Wallace Barnes Co.
DIV. ASSOCIATED SPRING CORP.
Bristol, Conn.

Windows of WASHINGTON

BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ PRESIDENT Roosevelt in a special national defense message to congress last week asked for an appropriation of $525,000,000, of which $210,000,000 would actually be spent before the end of fiscal year ending June 30, 1940.

The Chief Executive would spend $450,000,000 for the army, $65,000,000 for the navy and $10,000,000 for training civilian air pilots.

He suggested $32,000,000 be spent for educational orders "to enable industry to prepare for quantity production in an emergency of those military items which are noncommercial in character and are so difficult of manufacture as to constitute what is known as 'bottle-necks' in the problem of procurement."

Proposal is made in the message for an appropriation of $300,000,000 for the purchase of airplanes for the army which, of course, is included in the $525,000,000 proposed for that branch. It is contended this amount "should provide a minimum increase of 3000 planes, but it is hoped that orders placed on such a large scale will materially reduce the unit cost and actually provide many more planes."

To Use Private Plants

The President said "military aviation is increasing today at an unprecedented and alarming rate. Increased range, increased speed, increased capacity of airplanes abroad have changed our requirements for defense aviation. The additional planes recommended will considerably strengthen the air defense of the continental United States, Alaska, Hawaii, Puerto Rico and the Canal Zone. If an appropriation bill can be quickly enacted, I suggest that $50,000,000 of the $300,000,000 for airplanes be made immediately available in order to correct the present lag in aircraft production due to idle plants."

In connection with the estimated $65,000,000, for the navy the President suggested $44,000,000 be used for creating or strengthening navy bases on both coasts and $21,000,000 be used for additional navy airplanes and air material tests.

Mr. Roosevelt asked that "congress quickly act on this emergency program for the strengthening of the defense of the United States."

At press conference, the President stated the program contemplates building the new airplanes entirely in private plants with exception of experimental planes. He said present plants are able to take care of the program by working two or three shifts.

"STRATEGIC MATERIALS" BILL REINTRODUCED

A bill providing for acquisition of strategic and critical raw materials, concentrates and the alloys essential to manufacturing supplies for the armed forces in time of national emergency was reintroduced in the upper house last week by Senator Thomas, Utah, chairman of the subcommittee which handled this bill at the last session. Included were manganese, tin and similar commodities.

"There seems to be agreement among government experts that certain products should be conserved or developed," Senator Thomas said, "so that America would not be caught short with respect to national defense in the event of an emergency.

"The creation of stockpiles for warehousing defense materials is anticipated in the bill. These would be distributed throughout the country with a mind toward geographical distribution, nearness to source of supply, and military and naval necessity. Their location is a matter for the experts. No attempt to define these regional piles will be made in the legislation itself as offered by the subcommittee.

"This bill is the first or forerunner of the defense legislation made necessary by the international situation and outside competition for armaments. . . .

"The commodities to be acquired under this proposal are to be used by the order of the Executive only in the time of war or when a national emergency is stated to exist.

"The bill authorizes the appropriation of 25 million dollars for each of the coming four fiscal years, including the present, for procurement, transportation and storage of materials for both civilian and military use in event of an emergency, and another half million dollars to the bureau of mines and geological survey each of the same four years for scientific, technologic and economic investigation.

8625 TONS TIN PLATE SCRAP ALLOTTED FOR EXPORT

National munitions control board in its annual report to congress last week had considerable to say about the tin plate scrap export licensing situation.

It reported the impression has gone abroad that the act's object is, in the interest of national defense, to retain tin and tin-bearing materials in the United States. The board pointed out, that the sole contribution the act makes to the national defense is assuring the detinning industry a continuous supply of the particular raw material, tin plate scrap, with which the industry deals that the industry may be kept in a healthy state and be available as a domestic source of tin in case of national emergency.

The board reported actual tin plate exports for 1937 were 14,126 long tons; for 1936, 14,375 tons; for 1935, 34,928 tons; for 1934, 40,000 tons; and for 1933, 33,000 tons.

In 1937, 108 export licenses were issued for 16,608 long tons, valued at $383,187.50 with an average value of $20.06 per ton. It is further shown in the report that in 1936, 49 licenses were issued for export of 6483 long tons, valued at $106,854

with an average value of $16.48 per ton.

Last week the secretary of state announced allotments totaling 8625 long tons have been assigned to 44 producers for export subject to license during 1939. Applications were received from 52 companies for allotments totaling 14,951 tons, but eight applicants failed to qualify.

FINDS DUPLICATION IN FEDERAL QUESTIONNAIRES

Last spring President Roosevelt asked for a survey by the central statistical board of questionnaires sent by various government departments to business and industry. He indicated he believed there was a great overlapping of such questionnaires.

The central statistical board appointed a special committee consisting of government officials and outside experts to investigate. It reported to the President last week an overlapping of many unnecessary questionnaires and recommended certain remedies.

Broad changes in the law and procedures under which business firms and the public are called upon to report information to the federal government are urged. These changes are aimed to eliminate unnecessary duplication in federal reporting requirements and to make it possible, when a private citizen has filed information with one federal agency, for other federal agencies to make the fullest legitimate use of such information. Strengthening of the machinery for the co-ordination of reporting requirements of federal agencies is also recommended.

Although emphasizing that, in general, both administrative and nonadministrative reports provide needed information, the board found a substantial amount of unnecessary duplication.

REPORT ARGENTINA RESTRICTS IMPORTS

Argentina is reported to have refused to issue import licenses for tin plate and 140 other commodities, effective Jan. 1. Because the matter is reported in course of adjustment, the state department refuses to comment or to allow the commerce department to do so. It could not be learned last week whether other iron and steel products are contained in the restricted list.

AFL SEEKS AMENDMENTS TO LABOR RELATIONS ACT

Preparations are being made by the American Federation of Labor to support admendments to the Wagner act to make mandatory craft union employes be given an opportunity to vote on whether they want to join an industrial union, as the CIO, or retain their bargaining rights through their craft union.

Another amendment would prevent the board from invalidating AFL contracts with employers.

Other amendments would open board files to examination by parties directly interested in cases; require the board to decide within 30 days on applications for elections; stipulate a time limit within which board decisions must be given; require the board to give "due notice" to all parties interested in a case and broaden the power of subpoena witnesses.

DR. MOULTON ENDORSES HASTINGS' PROPOSAL

Dr. Harold G. Moulton, president, Brookings institution, in a letter to Senator Burton K. Wheeler, chairman, senate interstate commerce committee, gave his approval to the plan to postalize railroad rates, sponsored by John A. Hastings. Responding to Senator Wheeler's request for his opinion as to the practicability of Hastings' proposal, the economist said that he was "impressed with its soundness in principle," and that such a plan might prove of very great significance" and is "worthy of the most careful study."

CONSTRUCTION INSTITUTE PROTESTS TAX INCREASES

Identical letters on the tax situation have been sent to Senator Harrison, chairman, senate finance committee, and Representative Doughton, chairman, house ways and means committee, by the American Institute of Steel Construction.

"We would like to place upon the records of your committee the position of the structural steel industry regarding the tax problem which you have been called upon to consider at this session of congress," V. G. Iden, secretary, stated. "The attached resolution was adopted at our annual convention this year and fully explains our position.

"We feel that it is important that this should be called to your attention in view of the new request of the administration for a continuation of deficit spending, a practice of the federal government that we feel has greatly hampered the recovery of the construction industry."

The resolution follows:

"The cost of federal, state and local government in the United States has nearly doubled since 1923. In the 15-year period since 1923, the per capita cost of federal establishments alone has increased about 125 per cent; from $27.95 to $62.91.

"The per capita cost of all government has increased about 63.5 per cent from $79.96 to $130.75. During 1937, all government took 17.6 cents out of every dollar of national income, and in addition has had to borrow to meet a large part of current needs. If all current government expenses had been provided for by taxation, government would have taken 24 cents out of every dollar of national income in 1937.

"Deficit financing and heavy taxation both tend to curtail investments and extensions. While these conditions prevail there will continue to be hesitancy on the part of owners to put money in new structures. This is injurious to the prospects of the steel construction industry and those dependent upon it. Therefore, be it

"RESOLVED, That we, the members of the American Institute of Steel Construction, express our disapproval of the present trend in taxes, and urge upon our representatives in the congress of the United States and in the various state legislatures the need for relief from further tax burdens, the need for reform of the tax structure, and the need for an immediate balancing of all governmental budgets."

WALSH-HEALEY STEEL CONTRACTS $63,000,000 IN 1938

During 1938, the government let 1177 contracts under the Walsh-Healey act for iron, steel and their products amounting to slightly over $63,000,000, which was 9.01 per cent of the government contracts awarded last year.

During the week ended Jan. 7, the government purchased iron, steel and their products to the value of $326,922.31 under the act. Awards: Elastic Stop Nut Corp., Elizabeth, N. J., $16,754.67; National Forge & Ordnance Co., Irvine, Pa., $127,520.25; The Shaw-Kendall Engineering Co., Toledo, O., $13.159.20; Southern States Steel Corp., Dallas, Tex., $10,974.32; The Paterson-Leitch Co., Cleveland, $10,300; The Stearns-Roger Mfg. Co., Denver, $36,251; John W. Beam, Denver, $35,900; American Bridge Co., Cincinnati, $18,387.37; Frank M. Weaver Co. Inc., Landsdale, Pa., $10,388; and Bethlehem Steel Co., Bethlehem, Pa., $47,287.50.

PROPOSES INCREASE IN EDUCATIONAL ORDERS

A bill has been introduced in the house by Representative Smith, Connecticut, to amend the act passed at the last session providing for educational orders for various munitions of war.

The Smith bill provides for an appropriation of $35,000,000 for these orders and also authorizes the appropriation of $2,000,000 during each of the four fiscal years following the $35,000,000 appropriation. The act passed last year provided for a $10,000,000 appropriation covering a period of five years at $2,000,000 a year.

MEETINGS

FOUNDRY EQUIPMENT MAKERS CONVENE FEB. 14

■ POSITION of the industry under the wage-hour law and the status of patents are two subjects to be discussed by the Foundry Equipment Manufacturers' association at its annual meeting at the Terminal club, Cleveland, Feb. 14. Reports on association activities for the year will be presented and new directors elected. The meeting is open to all manufacturers of foundry equipment, regardless of membership in the association. Arthur J. Tuscany, Tuscany, Turner & Associates, Penton building, Cleveland, is executive secretary of the organization.

ELECTRICAL ENGINEERS TO HEAR PAPERS ON WELDING

Electric welding will be the subject of one session of the winter convention of the American Institute of Electrical Engineers, Engineering Societies building, New York, Jan. 23-27. This session, on the afternoon of Jan. 25, schedules five papers as follows:

"Predetermination of Temperatures in Resistance Welding," by W. C. Johnson, Princeton university, Princeton, N. J.; "Construction of Continuous Rails by Electric Welding," by William Dalton, General Electric Co., Schenectady, N. Y.; "Simplified Precision Resistance Welder Control," by F. H. Roby, Square D Co., Milwaukee; "Power Supply for Single-Phase Resistance Welders," by R. H. Wright, Westinghouse Electric & Mfg. Co.; East Pittsburgh, Pa.; "Alternating-Current Arc Progress," by C. J. Holslag, Electric Arc Cutting & Welding Co., Newark, N. J.

A paper, "An Electronic Control Circuit for Resistance Welders," by T. S. Gray and J. Breyer Jr., Massachusetts Institute of Technology, Cambridge, Mass., will be presented at a session on electronics and industrial power applications on the afternoon of Jan. 23.

NO EXHIBIT FOR 1939 AFA CONVENTION IN CINCINNATI

Cincinnati has been selected by the American Foundrymen's association for its 1939 annual convention, May 15-18. No exhibit will be held, the convention being patterned after the meetings in Chicago in 1927 and Toronto in 1935. The entire program will be devoted to technical, management and general interest sessions, shop operation courses, roundtable discussions, committee meetings, plant inspections and social functions.

Convention Calendar

Jan. 22-27—Canning Machinery and Supplies association. Annual convention at Stevens hotel, Chicago. S. G. Gorsline, Box 430, Battle Creek, Mich., is secretary.

Jan. 23-26—American Society of Heating and Ventilating Engineers. Annual meeting at William Penn hotel, Pittsburgh. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

Jan. 23-27—American Institute of Electrical Engineers. Winter convention in New York. H. H. Henline, 33 West Thirty-ninth street, New York, is secretary.

Jan. 24—Canning and Packing Machinery institute. Annual convention at Stevens hotel, Chicago. E. G. Vail, 205 West Wacker drive, Chicago, is secretary.

Feb. 8-9 — Steel Founders' Society of America. Annual meeting at Edgewater Beach hotel, Chicago. R. L. Collier, 920 Midland building, Cleveland, is secretary.

Feb. 9-11—Iron, Steel and Allied Industries of California. Fifteenth annual conference at Del Monte, Calif. C. S. Knight, California State chamber of commerce, San Francisco, is secretary.

Feb. 13-16—American Institute of Mining and Metallurgical Engineers. 149th meeting at Engineering Societies building, New York. A. B. Parsons, 29 West Thirty-ninth street, New York, is secretary.

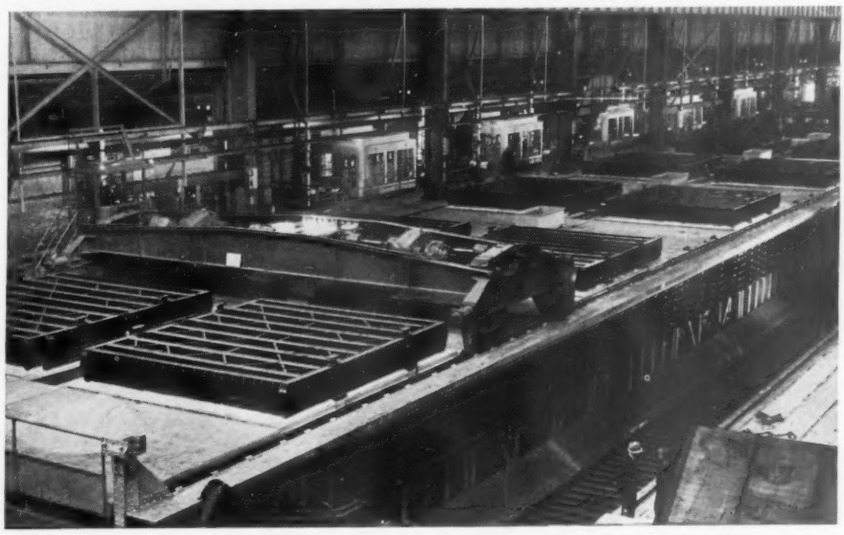
Feb. 14—Foundry Equipment Manufacturers' association. Annual meeting at Terminal club, Cleveland. Arthur J. Tuscany, Tuscany, Turner & Associates, Penton building, Cleveland, is executive secretary.

Feb. 16-17—American Foundrymen's association. Second regional conference of Wisconsin chapter and University of Wisconsin at Hotel Schroeder, Milwaukee.

Feb. 23-25—American Society of Mechanical Engineers. Spring meeting at St. Charles hotel, New Orleans. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

Feb. 23-25—American Foundrymen's association. Regional conference of Birmingham chapter and Birmingham section, American Society of Mechanical Engineers at Hotel Tutwiler, Birmingham, Ala.

New Pits Add 1,800,000 Tons Heating Capacity



■ Sixteen new soaking pits, built by Amsler-Morton Co., Pittsburgh, at Edgar Thomson works, Carnegie-Illinois Steel Corp., will add an estimated 1,800,000 gross tons to company's annual heating capacity. They will supply slabs to the Irvin works. Each pit is 15 x 16 x 8 feet, 4 inches, having capacity for ten ingots 28¼ x 38¼ inches, or eight ingots 29¼ x 44¼ inches. Three double-span automatic cover carriages manipulate the 16 covers, a new feature in pit furnace construction. A fourth carriage is a spare. All covers are self-sealing.

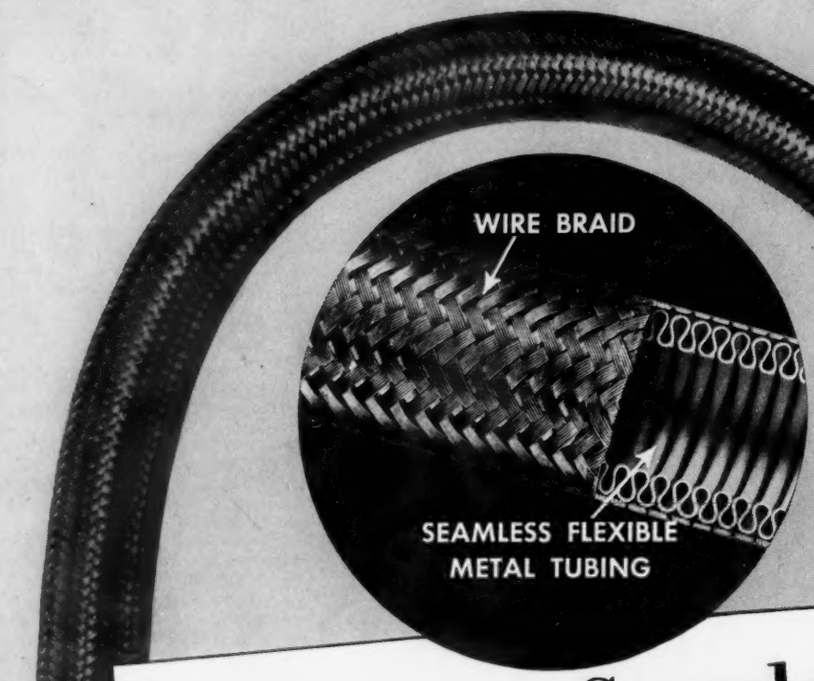
Zinc Institute Insists Lower Duty Is Menace

■ American Zinc institute, representing 95 per cent or more of the zinc mining, smelting and manufacturing industry of the United States, has made reply to the Dec. 20 memorandum by the state department, which asserted fears expressed by the industry because of 20 per cent reduction in import duties on slab zinc and zinc ore in the recent trade agreement with Canada were not well founded.

The institute claims its apprehension is based on actual consequences following announcement of the duty concession and inevitable developments from protection curtailment.

Under most favored nation clauses practically all zinc producing countries except Germany will profit by the reduction, Canada being a minor beneficiary, it says. In 1937 Canada contributed 6861 tons, Belgium 12,642 tons, Mexico 8117 tons and shipments from seven other countries made total imports 37,369 tons.

The institute estimates the zinc industry would have lost $6,000,000 in the last three years, and $1,338,000 during the past five months, if the new duty had applied.



American Seamless Flexible Metal Tubing

...Industry's Super Tubing

THE ideal flexible connector for misaligned or moving parts... for isolating vibration... for the dependable conveyance under high pressure of air, water, oil, steam or fuel. That's *American Seamless*—all metal, with no joints, welds, laps, seams or packing of any kind. The toughest tubing you can buy!

Write us about your connector problems. Our engineering department has a wealth of information on the use of *American Seamless* on all types of equipment.

Send for this free reference handbook on American Seamless Flexible Metal Tubing. Ask for Bulletin SS-3.

38335

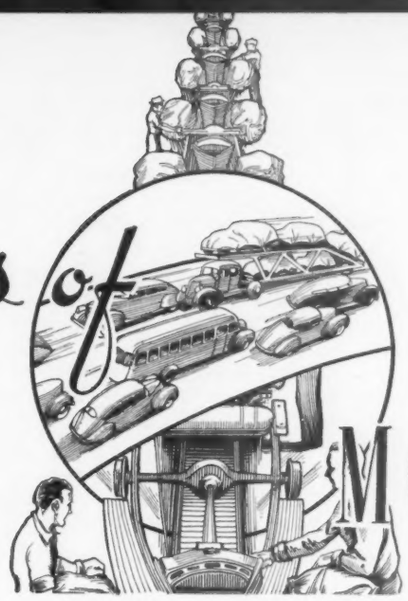
American Metal Hose

ANACONDA

AMERICAN METAL HOSE BRANCH of THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Conn. • Subsidiary of Anaconda Copper Mining Company

Mirrors of MOTORDOM



BY A. H. ALLEN
Detroit Editor, STEEL

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

DETROIT

■ AUTOMOTIVE engineers from Maine to California swarmed down on this city last week, 2000 strong, for the annual meeting of the Society of Automotive Engineers and, while they were not busy listening to scheduled technical sessions or joining such festivities as the "Gay Nineties" party arranged by AC Spark Plug Co., they gathered in small groups in hotel corridors to "talk shop."

Much time was devoted to technical discussions of aircraft, engines for aircraft, diesel engines and similar topics somewhat apart from strictly automotive technology. However, when engineers gather conversation eventually will drift around to some phase of automotive science.

For example, one group of experts got to talking about the efficiency of the gasoline engine, and of what a vast opportunity is open for raising efficiency level above the present average of 15 per cent.

Turbine Leads in Efficiency

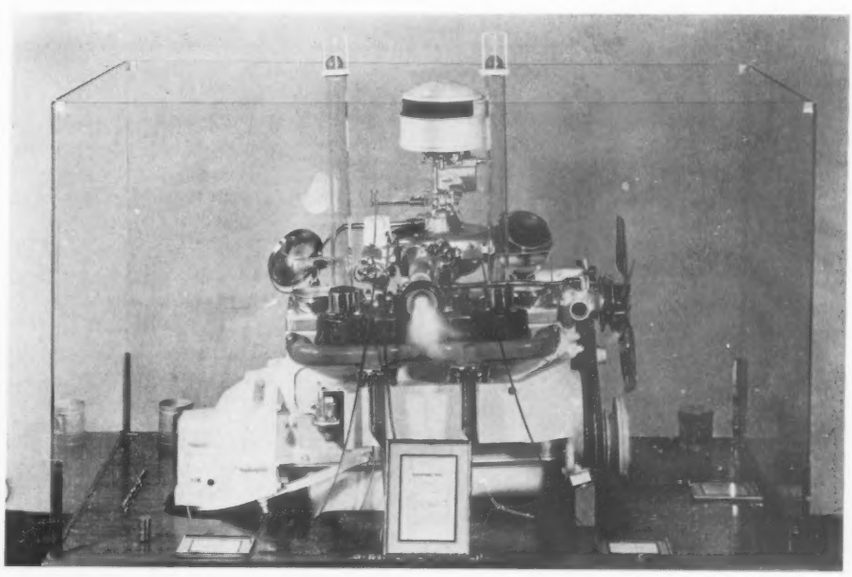
It seems apparent the answer to any marked improvement rests in an altogether different type of design than the present reciprocating engine—perhaps some form of rotary gasoline engine or gasoline turbine, if such a mechanism is conceivable. The steam turbine now is probably the most efficient form of heat engine, and if a practical, trouble-free automotive engine could be developed with the efficiency of the turbine, its designer could write his own ticket to fame and fortune.

In this connection, considerable interest is evinced in the new Union Pacific locomotive which employs a steam turbine to drive a motor-generator set which powers the unit. A similar power unit might be applicable to an automobile, but the excessive space required and the high cost of equipment seem to rule it out.

The discussion turned to aspects of modern passenger car engines and the question was introduced as to why an engine appears to operate with so much more pep and smoothness in certain types of weather—such as on damp, rainy nights. A number of factors influence this apparent step-up in power and smoothness. One is the fact that in damp weather a car tightens up appreciably and rattles disappear. Another is that lower barometric pressure usually accompanies inclement weather, and figures show a 1-point drop in the barometer to be accompanied by a 3-point rise in octane rating. Actually there is no change in characteristics of the fuel, but a lower atmospheric pressure means that a higher ratio of fuel to air is going into the engine, with a consequent boosting of power output.

There is the further matter of moisture content of the air and its influence on motor performance. Some engineers believe the added moisture results in improved combustion, and have even gone so far as to design and build vaporizers

Supercharger Plays Ping-Pong, Badminton



■ Ping-pong balls, badminton feathers and shaving mirrors are accessories in this exhibit of a supercharged Graham engine now touring the country, to show the efficacy of the supercharger. The ping-pong balls float in the glass tubes on air blown from the supercharger. Pinwheels of badminton feathers are whirled by the supercharger blast above cutaway portions of the block, and mirrors reveal the action of intake valves in the two end cylinders

which are connected to the radiator and supply a measured amount of water vapor to the manifold. A number of these devices are understood to have been developed, but no widespread success has attended their installation, and little is heard of them generally.

Highlight of the S.A.E. week was the program arranged for national defense day, at which military officers outlined problems of the nation's defense services. Brig. Gen. C. T. Harris Jr., assistant to the chief of ordnance, spoke on industrial mobilization for defense and reviewed the steps being taken to allocate eventual war production among 10,000 industrial plants in this country. Stating that the war department believed in fair profits, but not excessive profits, for industry engaged in production of war *materiel*, he further cited the vital necessity of co-operation between industry, labor and the military agencies active in planning for war procurement.

■ SOUNDINGS are being taken in the automobile industry to determine the acceptability of a new type of stainless-clad steel, not yet in commercial production. The process involves alloying the surface of a steel slab by passing it under carbon arcs and adding sufficient ferroalloy, properly distributed to form an alloy "skin." The slab then is routed through the usual continuous rolling processes and the alloy surface is maintained unbroken even when the material is reduced to thin gages. Naturally this process permits substantial reductions in cost of stainless-clad steel, which should be an interesting point for automotive users.

The alloy layer can be made extremely thin, and the proportion of alloy to total weight may be as low as one-half per cent. A particularly tough problem in the development stage was a suitable pickling treatment for the dual metal.

Description of the process will appear shortly. Its commercial adoption should lead to a host of new uses for stainless-clad steel because it will bring the price into a competing range with other steel coatings.

■ THE 15-20 per cent slowing in the rate of new car assemblies this month compared with last reflects in part the usual seasonal tendency encountered at this time of year, accentuated by the inroads of severe winter weather in many localities. Icy roads are strong deterrents to new car sales, and also complicate the problem of driveaways. Normally, thousands of cars are shipped here, four or five at a time, on large trailers specially built for light weight and high strength. When the roads are bad, it is understood insurance rates on these driveaways mount inordinately, and cause some shippers to suspend trips.

Truckers of new cars also are considerably disturbed by the recent ICC order for railroads shipping new cars out of Detroit to lower their rates, bringing them more into line with trucking rates. As yet, the effect of this order has not been noticed particularly, but it should tighten appreciably the competition between truck and rail shipments, especially in view of the fact truck crews are seeking a wage increase at the same time.

Despite the easing of assemblies, the pace is about 50 per cent ahead of a year ago, and executives continue to be uniformly optimistic.

Slowing of schedules is causing concern in the ranks of labor, and already two union locals have voted to accept shorter work weeks—in one case 28 hours and in another 24 hours—rather than see employment rolls slashed.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405,799	376,629	390,350
Dec.	518,958	347,349	*412,000
Year	4,616,274	5,016,437	*2,660,681

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1938	1937†
Dec. 17	102,905	82,025
Dec. 24	92,890	67,230
Dec. 31	75,215	49,550
Jan. 7	76,685	54,084
Jan. 14	86,925	65,735

†Comparable week.

	Week Ended Jan. 14	Jan. 7
General Motors	35,540	32,230
Chrysler	20,860	21,610
Ford	21,750	17,740
All others	8,775	5,105

■ MEANWHILE in union executive councils latent strife again has broken out into the open and this time UAW President Homer Martin and his opponents appear headed for a showdown. Special session of the UAW executive board was called last week despite Martin's objections, ostensibly to determine what progress Martin was making in his Ford organizing campaign. If Martin emerges successful, the UAW likely will break away from the CIO and become an autonomous union. If he should be defeated and ousted, then look for discord and violence to break out on a wide scale. Martin declares he is opposed by communistic elements in the UAW. He already has suspended the officers and seized the books of the Plymouth local in his campaign to rid his ranks of what he terms subversive groups. A national referendum of the UAW membership appeared to be the likely prospect late last week, with the vote being called to affirm Martin's policies, or to oust him, about March 1.

Martin's conferences with Harry Bennett, Ford personnel director, have led to numerous reports that Ford has changed his labor policy, that organization was imminent at the Rouge plant, etc. In a statement, Bennett said, "There is no intention of changing the policy of the company on labor. We believe it has been fair and just. My personal feeling for Homer Martin has nothing to do with the policy of the company. I admire the man's pluck and courage in weeding out of the union the communistic and radical elements."

"Slowdown" Strike at Dodge

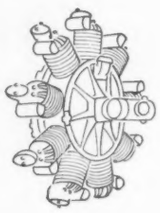
A short-lived slowdown strike at the Dodge forge plant resulted in tie-ups last week at Briggs and Plymouth, but operations resumed a normal pace after the dispute at Dodge was adjusted.

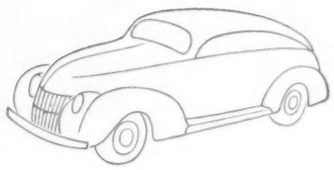
The state legislature still is mulling over Governor Fitzgerald's recommendation for the passage of a new labor relations act, under terms of which a labor relations board of five would be set up to hear labor disputes; sitdown strikes would be outlawed; picketing would be restricted to employes of a struck plant; and numerous other provisions would be made to prevent calling of strikes until all mediation efforts had been exhausted.

■ PLYMOUTH field men convened last week in 13 key cities to formulate plans and lay the groundwork for the pending introduction of a new line of commercial cars and light delivery models. A new series of commercial models in 116-inch wheelbase, a new panel delivery truck and a new series of five utility vehicles signalize a concerted drive by Plymouth for sales in this field.

Hayes Body Corp. is sponsoring a new stock issue to provide funds for what many believe will be an effort to line up the "body-in-white" business for the Hupp Skylark.

FULL ANTI-FRICTION ADVANTAGES AT A MINIMUM COST





YOU CAN GET all the advantages of anti-friction construction in your product by using the Torrington Needle Bearing—at a cost that seldom exceeds that of a plain bushing.

In power tools and aircraft engines, business machines and automobiles, manufacturers have increased product value and lowered costs with this unusual bearing.

Here are some of the advantages which you too can obtain with the Needle Bearing.

You can save space and weight, for the Needle Bearing is small and compact. Load capacity is high in proportion to size—the full complement of needles gives many linear inches of contact to carry heavy loads. The design of the bearing—its long axis and small diameter—allows you to use the simplest form of housing.

You can save assembly time, for the bearing is a single unit, easily pressed into place in the housing bore. The hardened retaining shell holds the needles securely in place and acts as the outer race. In most applications, the shaft itself, accurately machined and properly hardened, forms the inner race.

Your customer will find that the bearing needs little service attention. The retaining shell, with its turned-in lips fitting closely to the shaft, holds ample grease or oil for long periods of operation. The rotation of the needles constantly provides lubricant to the rotating shaft. And with all these features, the bearing is surprisingly low in unit cost.

Why not investigate these advantages in your own product? The Torrington Engineering Department will cooperate with you in laying out bearing applications. For further information, write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Circular No. X from our associate, Bantam Bearings Corporation, South Bend, Ind.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings
Branch Offices in all Principal Cities

TORRINGTON NEEDLE BEARING

Editorial

More Factual Information Is Needed

■ RECENTLY the National Association of Manufacturers asked the following question of a large number of investors chosen at random from lists of stockholders:

"Do you have money available which you could invest and would like to invest in new securities of either new or existing productive enterprises (as distinct from government and other high grade bonds or the well seasoned stocks of existing companies) but which you do not care to invest in such securities at the present time?"

Nearly 3000 investors responded, 75.1 per cent answering "yes" and 24.9 per cent answering "no."

Those answering "yes" were then asked to indicate the reasons for their lack of willingness to make additional investments. Inadequate present profits was named by 38.4 per cent. Those who held doubts of adequate future profits gave many reasons for those doubts, the following being most important: Labor trouble 62.6 per cent, international troubles 19.5 per cent, existing legislation 76.4 per cent, possible new legislation 73.6 per cent, existing taxes 74.8 per cent, new taxes 72.2 per cent.

Taxes and Restrictions Remove Incentive to Free Investment

Of those feeling that even if adequate profits were earned now or in the future the government takes so much in taxes that investment is not worth while, 81.7 per cent said taxes are too great a burden on corporations and 60.7 per cent said they were too great a burden on individuals, many listing both. Government legislation was held to be too stringent in a number of ways, the most important being restrictions on purchase of securities, 60.1 per cent, restrictions on sale of securities, 56.9 per cent, restrictions on new issuances, 48 per cent, and many named all three.

A total of 61.9 per cent signified that they preferred new securities to tax-exempt government bonds.

A wide range of factors which would create willingness to invest were listed by some of those who replied. Factors listed by 10 per cent or more of the investors as being the most important were: Improved government policies and attitudes affecting business, 38.8 per cent, change in government spending and budgeting policies, 36.3 per cent, less government competition with business, 15 per cent, reduced taxes, 14.8 per cent, change in federal labor legislation, 13.9 per cent.

Results of the survey were placed in the hands of John N. Garner, president of the senate, and William B. Bankhead, speaker of the house, in the hope that they will be of assistance to the new congress in shaping its legislative policies.

Give Congress Concrete Facts To Guide in Aiding Recovery

Businessmen have every reason to believe that public opinion of late has become much more friendly toward business and that the members of the congress are imbued with a recognition of this fact. Nevertheless, there is great confusion in congress as to how business can be helped. While the national labor relations act seems due for revision, clairvoyant powers would be needed to foresee the finished product. There is no assurance as yet that government spending will be reduced. The nature of coming business legislation is not yet revealed. In the meantime—as reflecting the possibilities—the old federal licensing bill has been re-introduced.

But the congress is fully cognizant of the fact that the country cannot have a return to real prosperity as long as nine or ten million employables are idle. Receptive ears will be found for factual information, rather than unsupported opinions, as to how this basic problem can be solved. The survey conducted by the National Association of Manufacturers is a fine example of what industry can do in making such information available. There is room for much further effort along these lines.

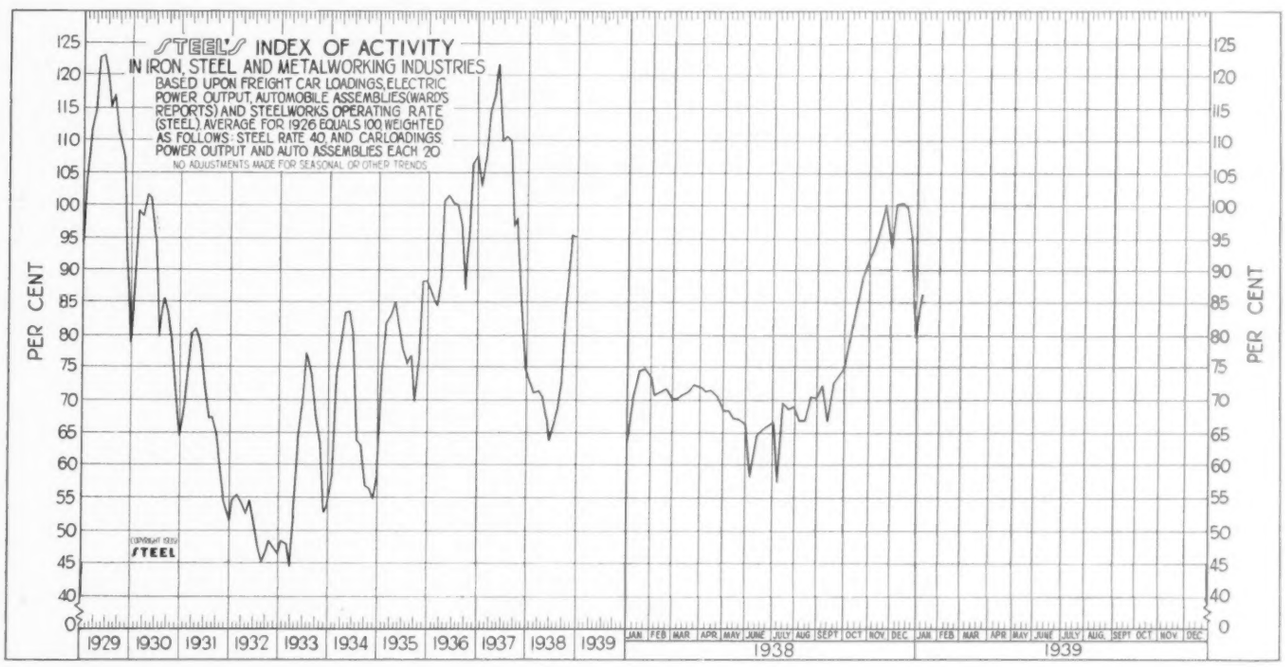
The BUSINESS TREND

Activity Index Regains Part of Recent Losses

■ REFLECTING the rebound in activity in the iron, steel and metalworking industries from the holiday interruptions, STEEL'S index advanced to 86.5 in the week ended Jan. 7. This represents an increase of 6.6 points over the previous week and compares favorably with 70.1 in the identical week last year.

Steelmaking operations rose 11.5 points to 51.5 per cent in the week ended Jan. 7, and still further gains are predicted through January. A year ago the national steel rate was 26 per cent. As anticipated automobile assemblies remained substantially unchanged in the week ended Jan. 7. Production in that week increased slightly to 76,685 units, compared with 75,215 in the previous week and 54,084 in the week ended Jan. 8, 1938. December factory sales of passenger automobiles and trucks are estimated at 411,200, bringing the 1938 total to 2,659,881, a decline of 47 per cent from the 1937 volume.

Revenue freight carloadings increased approximately 31,000 cars to 530,849 in the week ended Jan. 7. This recent gain failed to restore the loss incurred in the preceding week and also fell below the corresponding week a year ago of 552,314 cars. The drop from a year ago is mainly accounted for by the fact the first two days of this year were holidays whereas last year a


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939
STEEL

STEEL'S index of activity gained 6.6 points to 86.5 per cent in the week ended Jan. 7:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7
Dec. 24	94.8	69.5	93.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9†	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8

†Revised.

similar situation did not exist during this period.

Electric power consumption was the fourth business indicator of the four composing STEEL's index to record an increase in the week ended Jan. 7. Power output in that week of 2,169,470,000 kilowatt-hours compares with 2,120,555,000 kilowatt-hours recorded in the week ended Dec. 31. In the identical week last year power output was 2,139,582,000 kilowatt-hours.

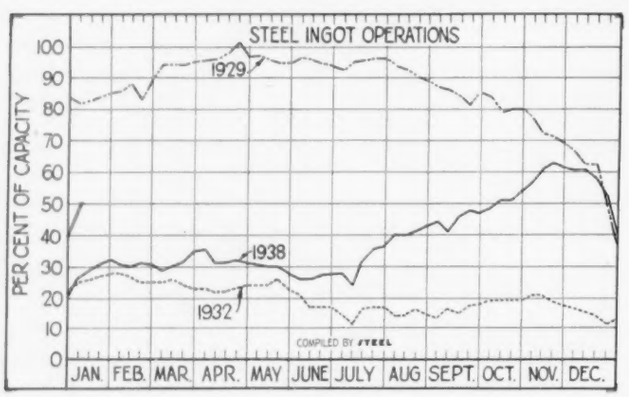
Industrial leaders are waiting for some tangible evidence of constructive action by congress before releasing capital on long term risks. Amendments to the Wagner act and certain other statutes, which have hampered the free play of industry in planning ahead, are considered highly desirable. The natural tendency is for a continued rise in industrial activity and spreading out of improvement. However, a revival of the heavy goods industries is dependent on a more promising outlook for corporate earnings which would lead to an expansion of new capital financing and larger capital expenditures.

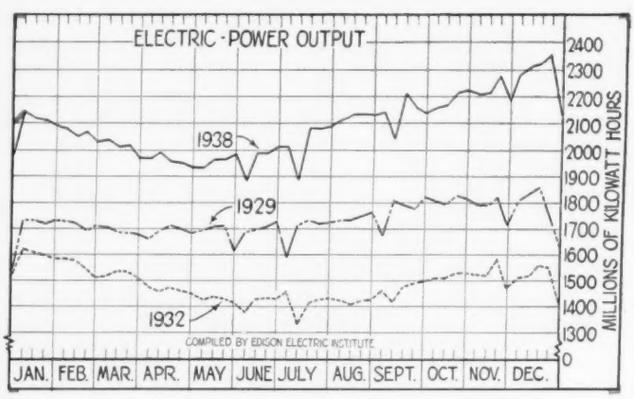
DECEMBER CAR AWARDS INCREASE

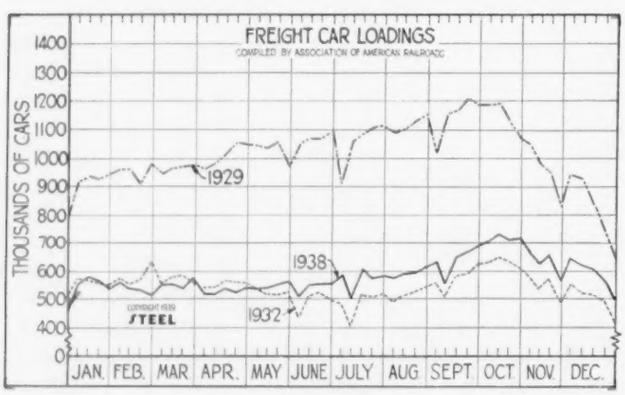
Domestic freight car awards during December totaled 2581 cars, compared with 1232 in November and 2537 in October. In December, 1937, car awards totaled 275. The December car awards represented the second largest monthly total during 1938, falling considerably below the peak of 6014 cars awarded in May. In 1938 awards aggregated 16,303, compared with 51,611 in 1937; 64,523 in 1936 and 19,308 in 1935.

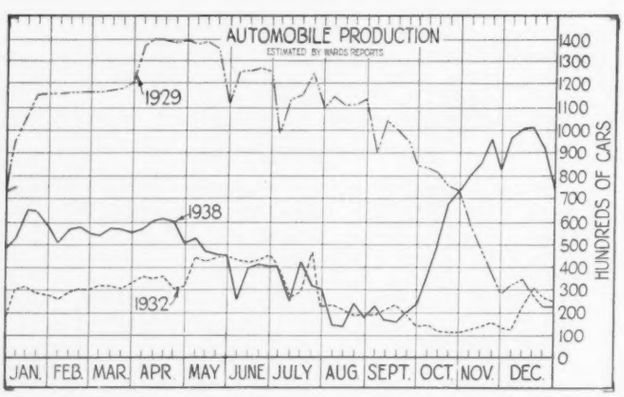
DECEMBER PIG IRON OUTPUT DECLINES

Average daily coke pig iron output in the United States in December amounted to 71,378 gross tons, a decrease of 4844 tons from the November average of 76,222. This was the lowest daily output since October, 1938, with 66,694 tons. Production for December, 1937, averaged 48,499 tons daily. Relating production to capacity, operations in December averaged 51.4 per cent, against 55 in November and 35.6 per cent in December, 1937. A net loss of six furnaces was recorded during December, leaving 115 in operation on Dec. 31, compared with 93 at the close of 1937. Total pig iron production in 1938 of 18,889,663 represents a decline of 48.6 per cent from the 36,709,139 tons produced during 1937. Since the beginning of the depression in 1930, there were only three years in which tonnage was below that of 1938; namely 1932, 1933 and 1934.

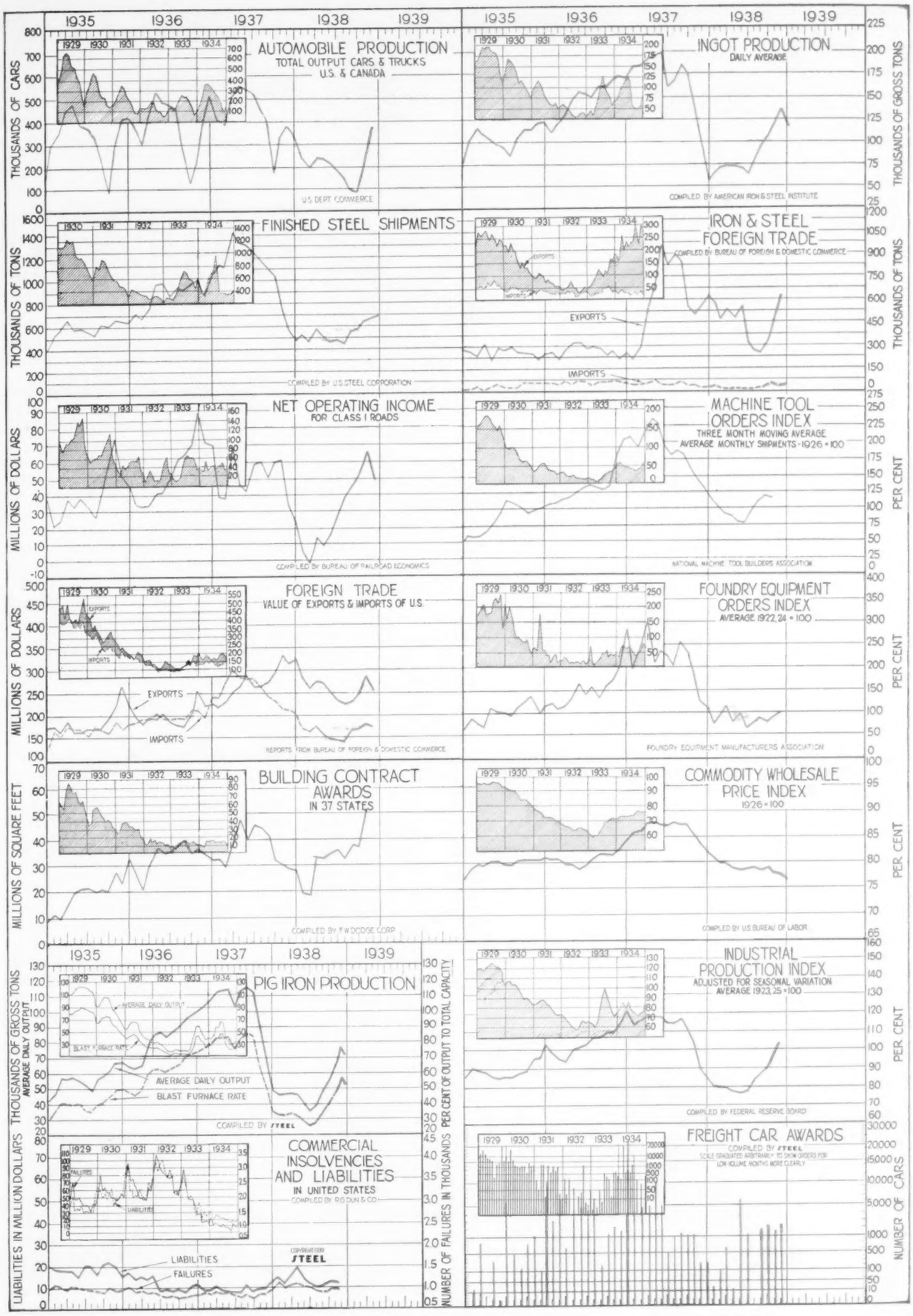




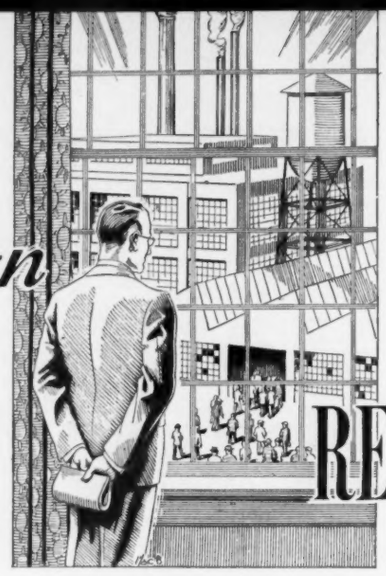




Week ending	Steelworks Operating Rate Per Cent 1938	1932	1929	Electric Power Output Million KWH 1938	1932	1929	Freight Car Loadings Thousands of Cars 1938	1932	1929	Weekly Auto Output 1938	1932	1929
Oct. 8	48.5	19.0	85.0	2,154	1,506	1,819	703	625	1,179	37,665	14,568	83,201
Oct. 15	51.5	19.5	84.0	2,182	1,507	1,806	726	650	1,179	50,540	12,675	82,088
Oct. 22	51.5	19.5	79.0	2,214	1,528	1,799	705	642	1,186	68,360	11,165	81,882
Oct. 29	54.5	19.5	80.0	2,226	1,533	1,824	709	617	1,134	73,335	11,117	76,870
Nov. 5	57.5	21.0	80.0	2,207	1,525	1,816	673	587	1,072	80,030	12,247	73 048
Nov. 12	61.5	21.0	77.5	2,209	1,521	1,798	637	537	1,050	86,300	13,685	61,824
Nov. 19	63.0	19.0	73.0	2,270	1,582	1,794	657	576	983	96,735	16,497	49,160
Nov. 26	62.0	17.5	71.0	2,183	1,475	1,818	562	494	950	84,930	13,389	38,219
Dec. 3	61.0	16.0	69.5	2,285	1,510	1,718	649	547	837	97,795	12,398	28,079
Dec. 10	61.0	15.0	67.0	2,318	1,519	1,806	619	521	937	100,705	21,695	31,255
Dec. 17	58.0	14.0	63.5	2,332	1,563	1,841	606	517	923	102,902	30,589	33,293
Dec. 24	52.0	12.0	63.5	2,362	1,554	1,860	574	495	843	92 890	27,396	23,216
Dec. 31	40.0	13.0	38.5	2,120	1,415	1,638	500	407	638	75,215	25,598	23,967
	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,734	531	552	573	799	76,685	54,084	18,593	75,000


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS
U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF GROSS TONS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
PER CENT
MILLIONS OF SQUARE FEET
AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ WHEN taxes on industry become so heavy that they cannot readily be absorbed in the cost of doing business and cannot successfully be passed on to consumers of industrial products, two serious things happen: Investment of new capital in industry is choked off; existing capital in industry ceases to work to its full capacity.

Such is the state of affairs existing today, according to H. Boardman Spalding, director, A. G. Spalding & Bros., New York. He is convinced that before American industry can provide full employment for our employable population, this deadlock must be broken. STEEL's discussion on re-employment this week is devoted to the survey of this situation and recommendations for betterment which Mr. Spalding—as chairman of the committee on government finance—presented recently to the National Association of Manufacturers.

To drive home to readers the full signficance of present-day tax conditions, Mr. Spalding raises the question as to whether anyone would have been willing to provide the capital to start the Ford Motor Co., had there existed at that time a threat of tax laws which would confiscate over 50 per cent of its possible profits; or—assuming that it did somehow get started under such conditions—whether it would be what it is today had 50 per cent of its profits been taken in taxes during its formative years.

—*The Editors*

■ AS I VIEW our current economic situation, two facts stand out: First, our existing industrial capital is working far below its capacity; second, the investment of many billions of new capital will be required to provide full employment for all of our employable population.

It is outside the scope of this article even to attempt to enumerate all of the causes of the present situation. I do not wish to imply that unsound tax laws are the sole cause or even the major cause. I believe however that they definitely are contributing to prolong our present unsatisfactory economic conditions. Therefore it is with taxes that my comments primarily are concerned.

When taxes neither can be absorbed in the cost of doing business, nor passed on successfully, there are two inevitable results. These I have already mentioned, but I repeat them for emphasis: First growth of capital is reduced; second, existing industrial capital ceases to be employed to its full capacity. While it must be remembered that certain other factors do influence both of these conditions, I submit to you that existing tax laws—federal, state and local—are nevertheless contributing heavily toward bringing them about.

Examine the income statements of your own business. Note the mounting increase in the proportion of your gross income which is paid out in taxes. Have you increased your prices to cover this increased tax cost? If so, what has been the effect on your volume of output?

A short time ago I remarked to the head of an oil company that—because of inelastic demand for gasoline—an excise tax on gasoline is a good tax. His immediate reply was that the demand for gasoline is much more elastic than I seemed to think—that the demand for it falls off in proportion to any increase in price made to cover the taxes. Nor does this harmful effect stop with this reduced volume in the oil industry. A higher price for gasoline naturally increases cost of motoring. Hence fewer persons can afford to operate motor vehicles. This in turn results in fewer automobiles being sold. Then fewer parts are manufactured for the making of motors cars, which means decreased sales of materials, and so on all the way down the line.

If I carried this argument to what might seem to be its logical conclusion, I might wind up by seeking to prove that no taxes whatever should be laid on industry—but that would be absurd. Taxation is a highly practical problem. When I say that taxes must not decrease output unduly, I recognize that anything which increases costs tends to decrease output. But since taxes must be collected somehow, a sense of balance must be preserved.

Industry has absorbed and can absorb in its costs a large tax bill, provided that the ratio of the tax to total cost is reasonable and provided that there is due regard for the ability of each type of industrial activity to absorb the tax. The fact that ability to absorb taxes does vary among industries raises grave doubts as to the wisdom of a general sales tax at a uniform rate.

Disturbing effect of taxes on industrial activity has been intensified

by constantly changing character of our taxes and also by increased tax burdens which we have had to shoulder in recent years. To maintain business at full capacity there must be full and free exchange of goods and services. This requires a reasonable state of economic balance. Taxes of constantly changing character and amount tend to upset this economic balance.

The federal government relies for a substantial part of its revenues upon taxes measured directly or indirectly by business net profits. Such taxes are probably not considered by business as a part of costs but rather as sharing by the government in what is left after all costs have been paid. I cannot see wherein they directly cause utilization of existing industrial capital at less than its full capacity.

Although many will disagree with me in this, I believe that correctly defined net business profits constitute one of the fairest measures of taxes that we have—provided however that the rate is reasonable enough so that what is left after taxes is sufficient to induce free investment of new capital in the business.

Tax on Income Justified

If the only tax payable out of business profits were the federal corporation income tax at rates provided in the 1938 law, I do not think it could be charged with obstructing flow of new capital. These rates might even be increased somewhat. However, one must consider all the other federal and state corporation taxes which are measured directly or indirectly by net profits, then on top of those the high rates of individual federal and state income taxes paid after what is left of the profits are distributed in dividends. I am convinced that what finally is left is insufficient to encourage investment of new capital—especially in those enterprises where business risk is substantial.

Many great industries of today, and the business fortunes of those who developed them, gained their start through investment of capital in what at the time had all appearances of being decidedly risky enterprises. Would the Ford Motor Co. exist today if—during the years of its rapid growth—over 50 per cent of its profits had been taken in taxes? Would anyone have provided the initial capital to enable it to start, had there existed the threat of tax laws which would confiscate over 50 per cent of the profit if it proved successful?

Regardless of whether or not it is sound in social theory partially to level incomes through a progressive income tax, it is a fact that this has been carried to the point where it now represents such a high rate on

© Kay Hart, N. Y.

H. Boardman Spalding
Director, A. G. Spalding & Bros.
New York City

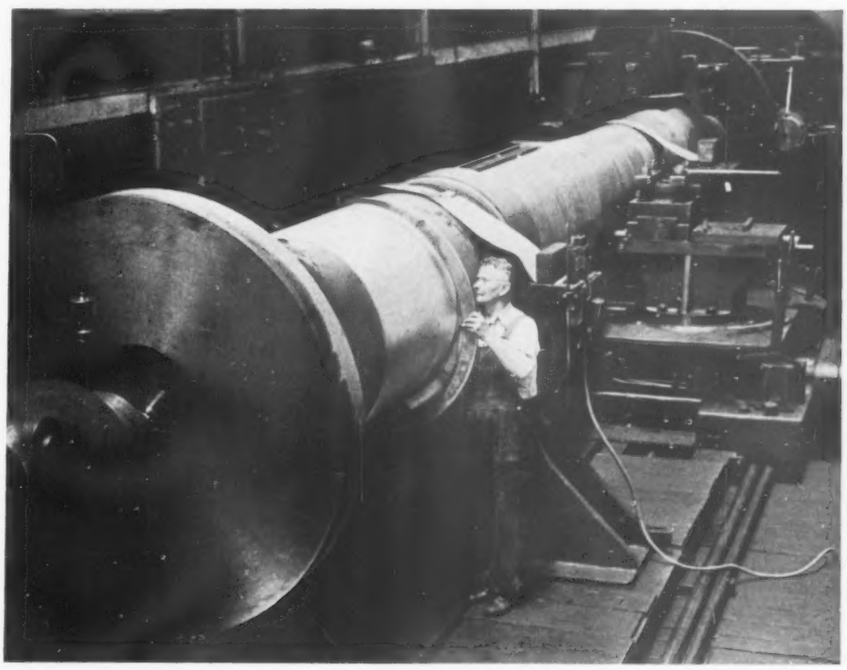
business profits that flow of new capital is obstructed. As the result we have lowered national income, lowered standard of living for everyone and established a vast army of unemployed.

The report of the National Association of Manufacturers on government finance stresses the need for reconsideration of ability to pay taxes. It points out that the yield of income taxes is uncertain and subject to wide fluctuation when based too much upon business profits and large individual incomes. It suggests as remedial measures:

1. A broadening of the tax base.
2. The elimination of the tax on intercorporate dividends.
3. Taxation of corporate profits at a uniform rate.
4. Elimination of what is left of the tax on undistributed profits.
5. Elimination of the normal individual tax on dividends.
6. Permission to file consolidated returns.
7. Corrections in statutory definitions of net income, improved treatment of inventory profits and losses, and simplification of depreciation.

Amendments embodied in the 1938 revenue act represent a substantial forward step. Through virtual repeal of the tax on undistributed profits and through changes in treatment of capital gains and profits, the burden on business profits has been lowered materially. It is to be hoped that any changes made during 1939 will give still further relief so that industry again can expand normally. This will benefit everyone. It will put thousands of people back to work and in the long run it will also serve to increase federal revenues.

Turns Huge Shaft to Close Tolerance



■ **A diametric tolerance of only 0.0005-inch was maintained in turning this large water-wheel generator shaft at plant of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Diameter of 36 inches in foreground was stepped to 28 inches at the other end. Roughing cut was made at speed of 35 feet per minute and finishing cut at 25 feet per minute**

In-Line Nonferrous Mill

With yearly capacity of 72,000,000 pounds, new mill includes reheating furnaces, hot and cold-rolling equipment, bright annealing units, continuous picklers, and completely mechanized handling equipment throughout the plant

■ UTILIZED FOR the first time in the nonferrous metals industry, straight-line production is featured in the new $1,500,000 plant recently placed in operation by Bridgeport Brass Co., Bridgeport, Conn.

With a total floor area of more than 220,000 square feet devoted exclusively to production of brass, copper and copper-base alloys in sheets, rolls and strips, the plant has capacity of approximately 6,000,000 pounds of metal monthly.

Mill layout is planned so flow of production is uninterrupted and materials proceed in one direction up and down the four main bays of the building from the first breaking-down mills to the inspection and shipping of the finished material. The building extends approximately north and south, and bays are numbered one, two, three and four from west to east.

Mill equipment consists in general of a 2 high, universal, reversing type, hot breaking-down mill; a 2 high, cold breaking-down mill; a 2 stand, 4 high, tandem, intermediate mill; two, 4 high, single stand, finishing mills and a battery of 2-high finishing mills; with annealing and cake-heating furnaces, pickling, overhauling, slitting, shearing and handling equipment in proportion to the rolling mill equipment, permitting integrated and harmonious operation between all individual units. Ample space also is provided for inspection and shipping.

Alloy castings or slabs are trucked to the basement of the new mill building via an underground passageway from the casting shop, located in another plant across the street, and are lifted by crane to the main mill floor adjacent to the hot and cold breaking-down mills. These mills are located in the south end of the Bay No. 1 and incorporate the latest design in brass mill equipment. Copper cakes for hot rolling are delivered directly to the mill building by railroad cars running on a siding parallel to Bay No. 1. Space is provided near both the hot and cold break-down mills for metal storage. Delivery to the heating furnace or to the cold mill table is readily accomplished by overhead cranes.

Continuous Furnace Used

Heating furnace for the hot mill is of the continuous oil-fired type, Fig. 1, and is parallel to the mill approach table. Cakes are passed through the furnace on heat resisting skids in three parallel lines. The furnace is equipped with three hydraulically operated elevators and charging is effected by three ram type pushers controlled from the mill pulpit.

Automatic temperature control regulates the input of fuel to the furnace, and each zone is controlled separately to permit efficient operation over a wide range of production. Cakes are moved through the furnace by the action of a pusher. As one cake is fed into the furnace, a heated cake is delivered onto the furnace delivery table which is set at right angles

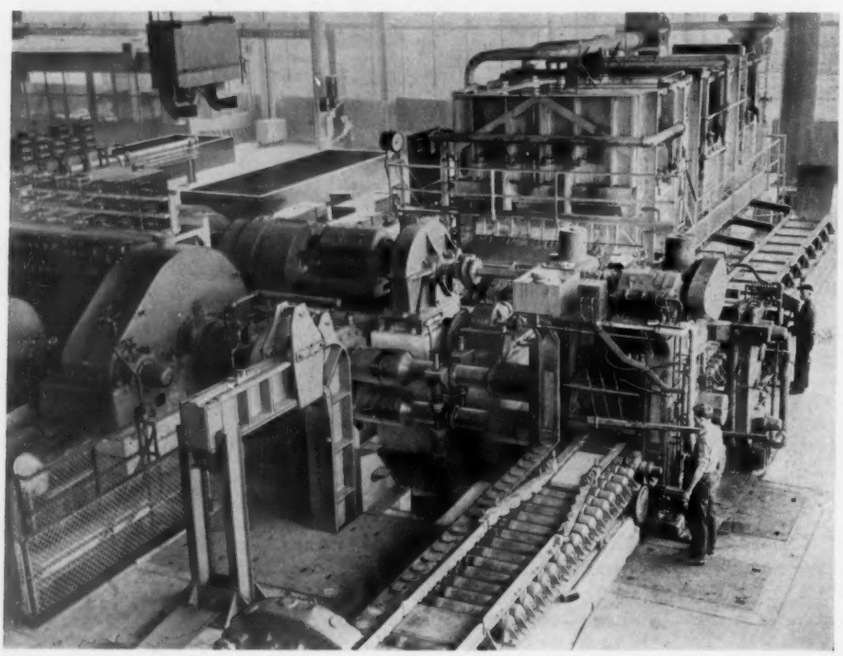


Fig. 1—Delivery side of hot breaking-down mill with cake-heating furnace in background at right. Opening through which castings are lifted by crane from underground passageway is in left background

to the mill approach table. Spring-cushioned furnace bumpers are provided to absorb the shock of the cakes as they leave the furnace and pass to the mill approach table which is located on a lower level. See Fig. 1.

Passing off the furnace delivery table, the cake approaches the 2-high, reversing type, hot breaking-down mill which is driven by a 1000 horsepower, direct current, reversing motor with Ward-Leonard control.

Indicates Roll Settings

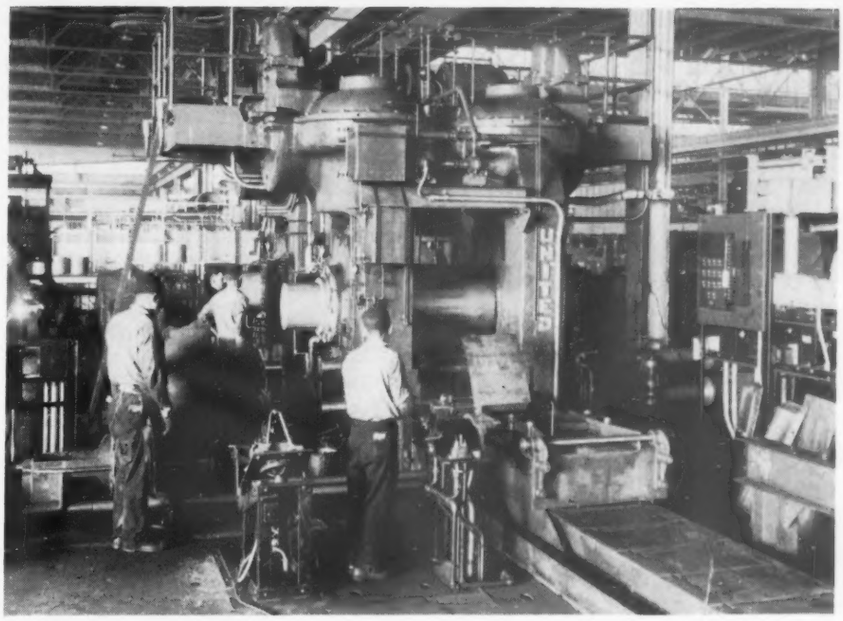
Horizontal roll screwdown and the edging rolls are controlled from the mill pulpit with Selsyn indicators to show the exact roll settings. Edging rolls are arranged so they may be driven in either direction simultaneously with the rotation of the main rolls, permitting edging in both the forward and reverse pass, or they may be operated only in the forward direction when the main rolls are running in this direction and remain idle when the main rolls are running in the reverse direction.

In addition to the mill proper, the hot-mill unit consists of a furnace delivery table, front and back roller tables, a runout and shear approach table, a chain cooling table and bar piler, a coiler and a vertical cropping shear.

Furnace delivery table, and front and back mill-approach tables are of the same general design and construction. Each table is driven by an individual motor. Rollers are forged steel, driven by mitre gears entirely enclosed, and mounted on roller bearings. Both front and back mill-approach tables are equipped with air-operated side guides, automatically operated in conjunction with the mill.

Runout table is the same general construction as the front and back mill-approach tables and is arranged for a cross transfer from the run-out table to the cooling table and bar piler. The shear, a vertical open-side unit, is clutch operated and is used for cropping the front and back ends of strip which is to be coiled.

The motor-driven coiler, located beyond the end of the shear delivery table, handles all the material to be coiled. A gravity, spiral, roller con-



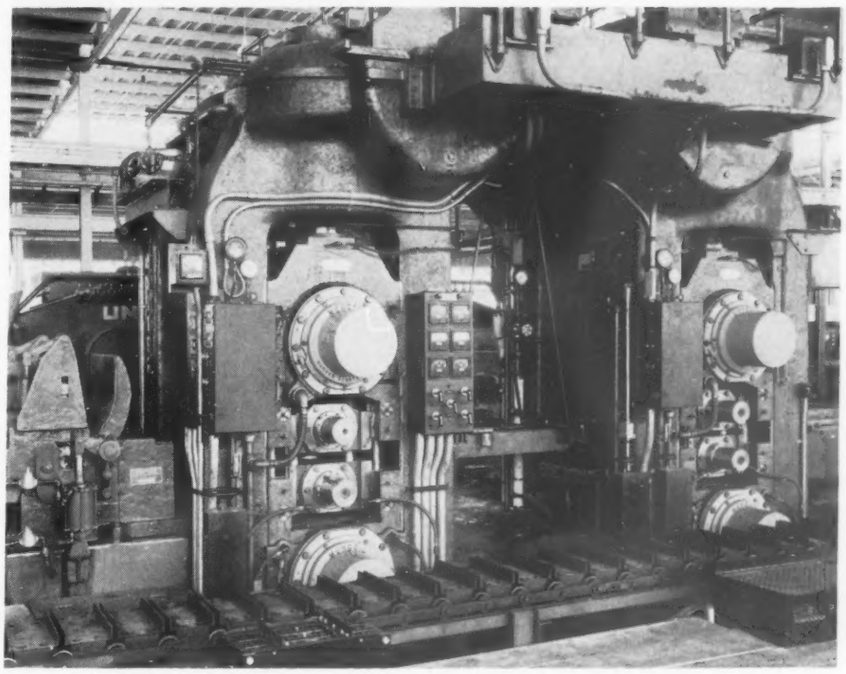


Fig. 2. (Top)—Entry side of 4 high, 2 stand, tandem cold mill with pusher-sticker. Courtesy United Eng. & Fdy. Co. Fig. 3. (Center)—The 4 high mill with transfer conveyor in foreground. Fig. 4. (Bottom)—Entry side of rundown annealing furnaces with transfer cars

veyor is designed to carry the coils away from the coiler and up-end them at the same time. An adjustable, chain type, transfer and cooling bed is provided for handling and piling the material to be worked in flat bars.

At the front of the mill building to the left of the hot mill unit is a 2 high, cold breaking-down mill that performs the first operation on metal to be worked cold. Castings, weighing upwards of 600 pounds, are brought up from the underground passage to a storage space near the mill. Castings are delivered to the mill in batches by cranes.

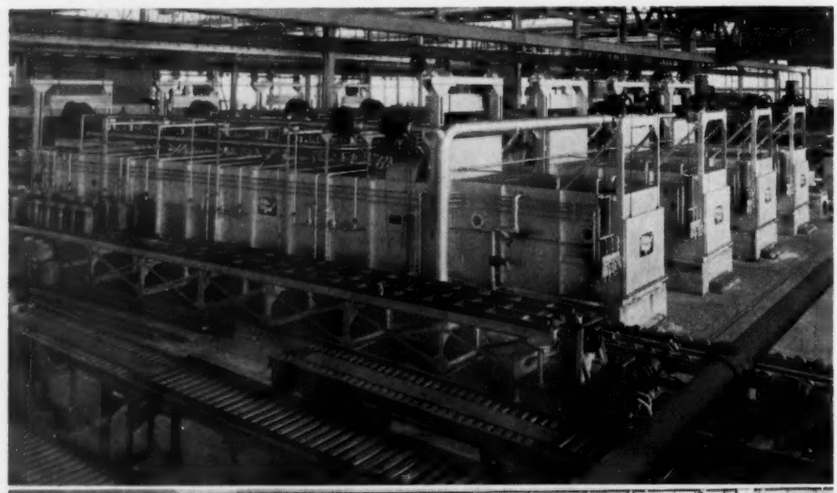
This cold mill includes a combination reduction gear and pinion stand, a lifting table equipped with a pneumatic pusher-sticker and hydraulically operated transfer-pusher on the entry side, a delivery piling table and hydraulically operated transfer-pusher on the delivery side and a motor-driven transfer car. Piles of slabs, placed by crane on the stationary table at entry side of mill, are moved by the transfer-pusher to the lifting table and are raised so top slab is in position to enter the mill. Top slab then is pushed off the pile and into mill rolls by the pusher-sticker.

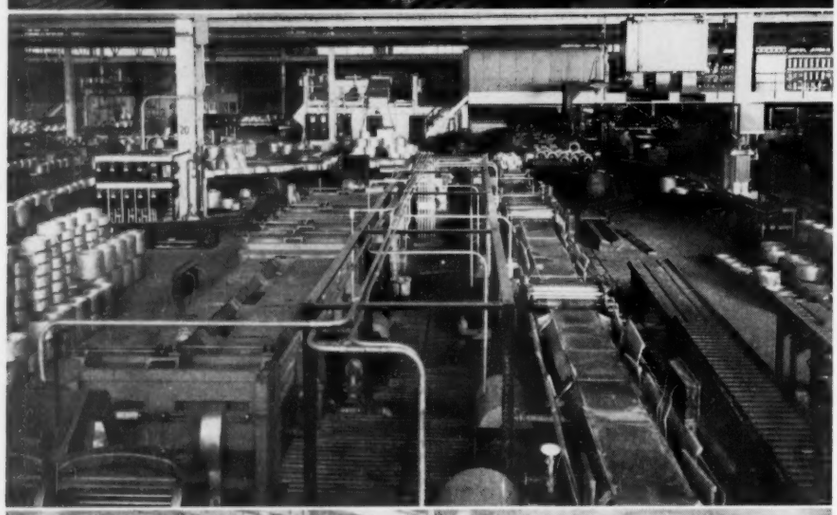
The motor-driven screwdown is controlled from the operator's stand with a Selsyn indicator to show roll settings. Horizontal mill rolls are driven through a magnetic clutch by a 2250 horsepower, alternating current motor which also drives a generator delivering current to the reversing motor of the hot breaking-down mill. Transfer-pusher and transfer car convey slabs from the delivery side to the entry side to keep the mill in almost continuous operation. After the necessary number of passes, castings or slabs are delivered by crane to a continuous walking beam annealing furnace located immediately north of the cold mill and equipped with an automatic, elevator type, loading and hoist table and an automatically operated, stripper and feeding mechanism preset for exact time movement. Slabs are passed directly through the furnace into a quench tank.

Firing Is Automatic

The furnace is oil fired by automatically controlled burners, installed above the hearth on the entry side and below the hearth on the delivery side. Slabs regardless of width or thickness, are heated to a uniform temperature throughout. Temperature control and recording instruments show exact temperature of each zone at all times and directly compare this temperature with the temperature-setting indicator. A multiple recording instrument makes permanent records of the entire furnace.

After cooling from this anneal, slabs are transferred by overhead crane to slab-milling units at the opposite side of the first bay where they are overhauled and prepared for further reduction on a 4-high tandem mill. The milling units are equipped with flattener rolls. A roller table and flop-over is provided between the two machines permitting continuous operation. Milling is always done on low side





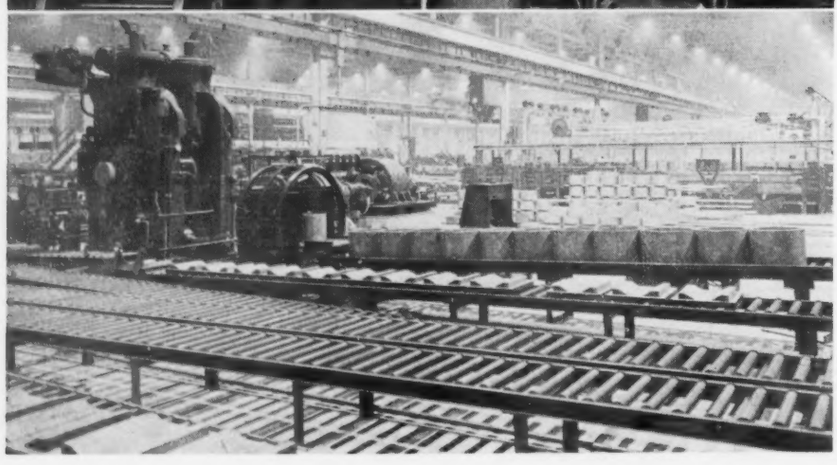


Fig. 5. (Top)—Delivery side of run-down annealing furnaces with transfer car in line with conveyor in immediate foreground at right. Fig. 6. (Center) — Continuous picklers, push-through type for heavy stock at right with pull-through unit for lighter gages at left. Courtesy General Electric Co. Fig. 7. (Bottom)—General view of plant looking south with one of two, 4 high, single stand, ready-to-finish mills at left and roller tables wihich permit continuous operation in foreground. Courtesy Benjamin Electric Co.

of slab so chips fall away from the cutter and are not rolled into the face of the metal. Scrap from the overhauled slab is conveyed by air to either of two overhead storage bins. From there it is drawn and fed by a vibrating conveyor and gravity to a vertical, hydraulic, baling press which makes a bale about 14 by 7 by 7 inches using a pressure near 3000 pounds per square inch.

After overhauling, the flat bars are inspected for a perfect surface and delivered by crane to the 4 high, rundown, tandem mill at the opposite side of the bay. Brass or copper, coming from the 2 high, hot breaking-down mill in flat slabs, also is delivered by crane to the slab miller and then to the 4 high tandem mill for further reduction by cold rolling.

Handles Coils or Slabs

The 2 stand, 4 high, tandem, running down mill, Figs. 2 and 3, will handle either coils or flat slabs. Conveyor and handling equipment is provided for efficient transfer of material. Each stand is driven by an 800 horsepower, direct current, adjustable speed motor at 0/575/-1020 revolutions per minute. A motor driven, continuous, oil circulating system is provided for lubricating the combination drives. Screwdowns, of the 2-motor type, are equipped with magnetic clutches to permit independent adjustment of housing screws when required. Selsyn indicators are provided at the operator's stand to show housing-screw setting.

In addition to the 4-high roll stands, the unit consists of a lifting table with a pneumatic pusher-sticker at entry side of first stand; a roller-top loading table at the outer end of the lifting table; a coil sticker located between the loading table and the first roll stand; a 3-roll coiler equipped with a tailing device attached to the delivery side of the second roll stand; a 2-way coil conveyor; a coil opener for providing a straight end on coils when desired; and a return conveyor to the coil-sticker loading device.

The lifting table and the pusher-sticker, similar to the one on the cold breaking-down mill, is used for the first pass of flat metal. After going through the mill, the metal is coiled on the 3-roll coiler, equipped with an air-operated ejector which delivers the coil to the coil conveyor holding about 25 coils. At the rear end of this conveyor the coils are transferred to a return conveyor carrying them to the coil-sticker loading device for another pass.

Rundown annealing for coils from the 4-high tandem mill is accomplished in a bank of four, gas fired, bright annealing furnaces, Figs. 4 and 5, which operate within a range from 900 degrees to 1300 degrees Fahr. Fuel consumption and performance characteristics are variable for annealing either copper or brass. Coils from the tandem mill are loaded by crane onto heat-resisting alloy trays and placed on a motor-driven transfer car which runs on tracks parallel to the entrance end of the four furnaces, Fig. 4. Charging is effected directly from this car. One tray of coils is pulled into the furnace by a motor-driven car tray puller, operated at the delivery end of the furnaces. An annealed set of coils is removed from the sealed-in quenching chamber at the discharge end of the furnaces and placed on a transfer car as shown in Fig. 5.

Furnace temperature is automatically zone controlled. By preventing entrance of air into the furnace and by quenching the metal direct from furnace atmosphere, excellent surface condition is retained. Furnaces are designed so the temperature in any coil in the final soaking zone immediately prior to discharge does not vary more than plus or minus 15 degrees Fahr. when furnace is operated continuously.

From the rundown annealing furnaces, coils are passed through continuous pickling machines and prepared for further running down or for finishing mills. The pickling operation is accomplished at this point by a continuous, push through machine for treating heavier gage metal and by a double trough, pull through unit which is operated at variable speeds to handle lighter gage metal in various widths.

Carried on Continuous Conveyors

Coils are brought on continuous conveyors from the continuous pickling machines or directly from the annealing furnace to the two, 4-high, ready-to-finish mills in the north end of Bay No. 1. The main rolls of these mills are independently driven by 400 horsepower, direct current motors.

Auxiliary equipment for these mills consists of an electrically controlled tension reel with an air-operated block, blocker, hydraulic stripper and stripper carriage; a friction-clutch reel with an air-operated block, blocker, hydraulic stripper and stripper carriage; two uncoilers having collapsing mandrels with hydraulic stripper and stripper carriages and one rewinding reel with a hand-collapsing block and stripper carriage. A specially designed roller conveyor system returns coils to the input sides of the two stands and permits a continuous cycle of operation.

Coils coming from the ready-to-finish mills or directly from the continuous pickling machines are rolled to final gage by finishing mills located in Bay No. 2. Discharge end of the ready-to-finish stands is in Bay No. 2 so transfer to any one of the eight finishing mills in this section is accomplished readily by crane. These finishing mills extend practically the full length of Bay No. 2. All finishing mills are about the same general design. Special handling equipment, such as roller conveyors and jib-cranes, is used with the mills to provide continuous operation and to permit efficient handling of materials.

Bay No. 2, devoted entirely to rolling to finished gages, includes in the south end two mills for finishing small orders and a mill for the special rolling of engraver's copper. Coils are delivered by truck from the various finishing mills to the north end of Bay No. 3 for finish annealing. Equipment includes twin type, recirculating, oil fired furnaces and continuous, pull through, gas fired, annealing furnaces for open and gas-atmosphere finish annealing.

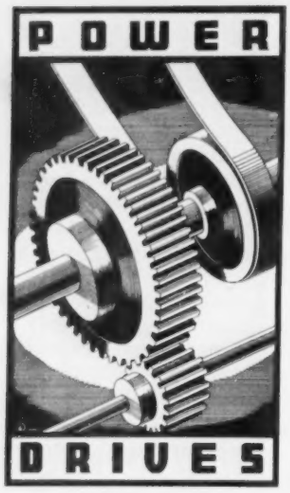
Finish-pickling equipment, just south of the annealing equipment in the same bay, includes continuous pull-through and push-through machines as well as the usual batch-pickling tanks. When pickled, finished material is shifted by truck to the inspection benches which are next in line in this bay.

South halves of both bays, Nos. 3 and 4, are devoted to a number of processes necessary to meet the varying specifications of copper and brass products consumers. Equipment includes straighteners, slitters, shears, stretchers and circling machines. Most of the handling in this section is by truck. Scales are located in the north center section of Bay No. 4 and the balance of this bay comprises the shipping department.

A railroad siding is located parallel to Bay No. 4 and truck shipments may be made readily from a platform in its extreme north end. It is readily seen that movement of all material, generally speaking, is in straight lines. However, in some cases, customer requirements necessitate some deviation in usual routing but even this has been worked out to eliminate practically all back tracking.

Screws Withstand Heat

■ A new, self-centering screw, recently brought out by American Screw Co., Providence, R. I., is furnished in monel metal for applications where fastenings must withstand high heat, abrasion and corrosion. Screw has a recessed head for nonslip driving. It requires no pilot hole,



Gearmotor Applications

Size and rating of gearmotors not only depends upon load horsepower requirements but also on motor and load characteristics. Diagrams help explain factors involved

By R. S. MARTHENS
Westinghouse Elec. & Mfg. Co.
Nuttal Works
Pittsburgh

■ APPLICATION of gearmotors is apparently limitless, for in nearly all types of machine design and mechanical transmission of power some form of speed reduction is required. As long as electric motors and other types of prime movers rotate at much higher speeds than driven equipment, gearmotors will be needed. They are compact and combine high efficiency, with low cost, neat appearance, few wearing parts, long life and proper enclosure to meet accepted safety requirements.

Machine designers are finding they can quite generally design their apparatus without regard to the varying power requirements of their customers. Whether it is alternating or direct current and whether it is 25, 50 or 60 cycles, proper gearmotors can be obtained. With this type of drive, machine designers can achieve a degree of standardization heretofore difficult. With present gearmotors, standardization can be obtained at a saving in cost and a shortened delivery schedule. Although many manufacturers of machine tools have previously provided their own gearing parts, they are now recognizing the advantages of purchasing gearmotors from the various manufacturers of this equipment.

Fig. 1 shows a comparison of speed torque curves for various types of induction motors. Since in most cases, actual load data cannot be obtained, it is considered necessary to provide for the maximum torque which can be developed by the motor parts. In the illustration, all speed torque curves might apply to motors having the same nominal or nameplate horsepower but the starting torques vary from 75 to 225 per cent of full load torque, and the pullout torques vary from 150 to 300 per cent.

In many instances there is a wide difference between name plate rating and capacity. The effect of the various torque curves on the starting and overload capacity of a motor may be more readily appreciated by a review of Fig. 3, which indicates that a squirrel cage induction motor may carry approximately three and one-half times its rated torque, provided the peaks do not occur more frequently than every four and one-half minutes and are of relatively short duration.

To further illustrate this point, the similar peak capacity of wound rotor induction motors also has been indicated. Peaks illustrated are maximum which can generally be carried by these types of motors without exceeding N. E. M. A. guarantees as to temperature, etc. Thus capacity which should be built into the gearmotor mechanical parts should be considered not only from the value of the peak but also from

Abstract from paper presented at twenty-first semiannual meeting of American Gear Manufacturers association, Skytop, Pa.

Fig. 1—Speed-torque curves of various types of induction motors. Turbine curve is shown for comparison only

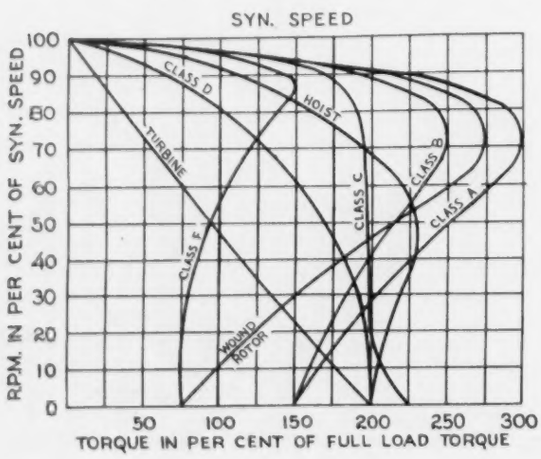
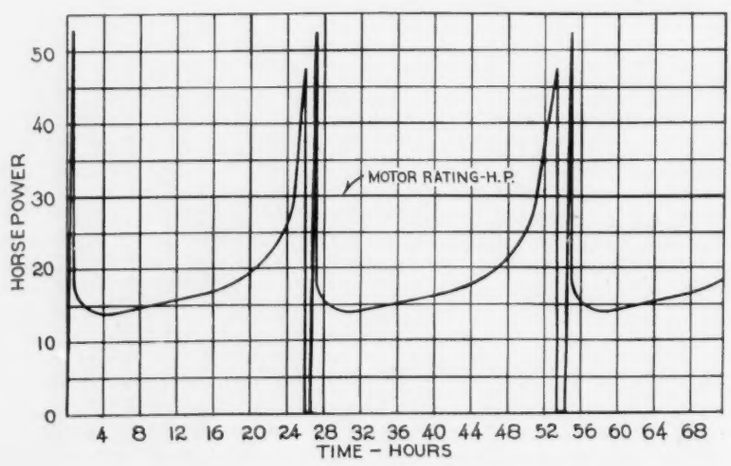
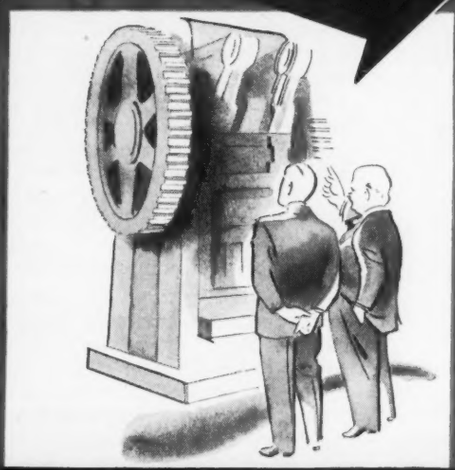


Fig. 2—Agitator duty cycle showing peaks about every 27 hours



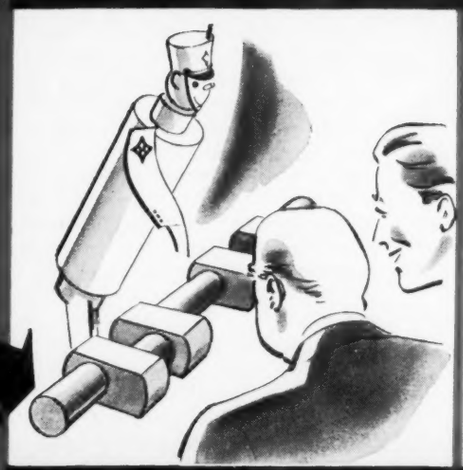
"SUPER" FORGING PUTS NEW LIFE IN A PRESS



"CRANK BREAKAGE ON THIS PRESS IS AVERAGING ONCE A WEEK . . .

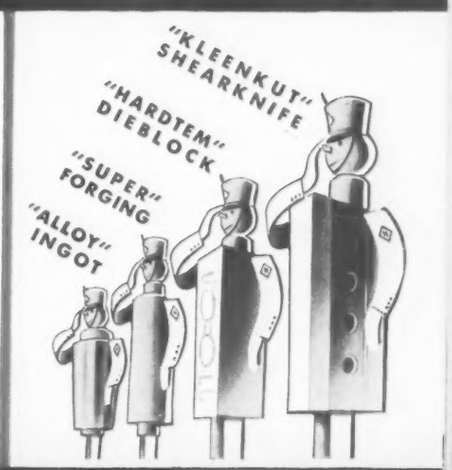
"WE'RE WAY BEHIND SCHEDULE . . . WHAT CAN WE DO ABOUT IT?"

"'SUPER' FORGING REPORTING, GENTLEMEN . . . I'VE GOT THE ANSWER."



"THIS HEPPENSTALL CRANK (2-C-30 ALLOY) CAN TAKE THE RAP."

(Later) "YOU'RE RIGHT, 'SUPER'... TWO YEARS... AND STILL GOING!"



AT YOUR SERVICE . . .
These Aids To Industry.

You, too, may have some problem like this one . . . an actual instance from the service files of Heppenstall. Heppenstall forgings, die-blocks, or shear knives may help you to solve it. These products *start* with finer steel . . . produced in a modern plant, and backed by three generations of active experience. The service-life reflects the extra care and skill behind each operation.

HEPPENSTALL PRODUCTS . . .

Die Blocks . . . Shear Knives . . . Hammer Rams . . . Piston Rods . . . Tinning and Galvanizing Rolls . . . Gellert Tongs . . . Locomotive Axles, Pins and Rods . . . E.I.S. and O.H. Alloy Steels . . . Carbon and Alloy Forgings.

HEPPENSTALL — Heppenstall has the Experience — QUALITY

HEPPENSTALL COMPANY

PITTSBURGH · BRIDGEPORT · DETROIT

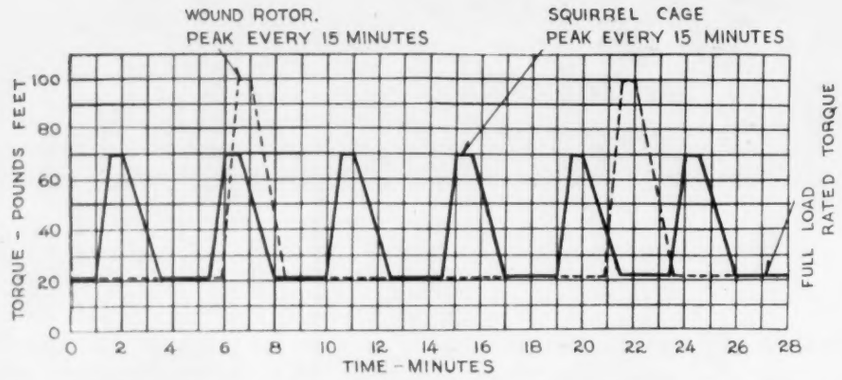


Fig. 3—Calculated duty cycles showing capacity of standard motors over three times rated torque for 4.5 minute peaks

duration and frequency of peaks.

Although agitators handling liquids and semi-liquids are frequently considered as providing a uniform load, a recent study of a specific case indicated a duty cycle, as illustrated by Fig. 2. Here the gearmotor is called upon to develop two peaks per 24-hour day, one at starting and the other at the point where the processing operation has been completed. In this particular case the peaks are of short duration and occur infrequently and therefore can be handled by the general purpose induction motor of the size indicated. Also, a set of gears, selected on the basis of the motor nameplate rating only, would be considered adequate. However, this same set of motor parts would be capable of carrying higher peaks and at more frequent intervals, as indicated in Fig. 3.

In application of gearmotors it is highly desirable to use a preferred series of output speeds. Accompanying table illustrates a typical preferred series. This enables the manufacturer to list uniform percentage steps in output speeds and enables customers to choose from the catalog a standard speed which is close to the required speed. In designing gearmotors, it has been found that the number of teeth in the gears and pinions can be so arranged that a preferred series of output speeds can be readily obtained. A joint A. G. M. A.-N. E. M. A. committee has been appointed and has now under consideration a preferred series similar to that illustrated. The American Standards association and the A. S. M. E. are also working on the problem of obtaining a suitable preferred series for all machinery speeds.

A general survey of industrial applications indicates that approximately 80 per cent of all motors of 1-horsepower and above are connected to the driven machines through some form of speed reduction.

In the application of gearmotors some manufacturers have installed on their test floor special rigs to test drives under conditions closely approximating the final installation. Testing of this type insures satisfactory operation in the field.

A large number of gearmotors have been used in connection with conveyor applications where extremely low speeds are required. In the majority of these applications, the gearmotor is mounted on relatively light structural work and connected to the conveyor head shaft by means of a chain drive. The chain sprocket is mounted directly on the output shaft of the gearmotor without outboard bearing support.

Table I

Decimal Preferred Numbers 20 Series (12 per cent)

1.12	11.2	112
1.25	12.5	125
1.40	14.0	140
1.60	16.0	160
1.80	18.0	180
2.00	20.0	200
2.25	22.5	
2.50	25.0	
2.80	28.0	
3.20	32.0	
3.60	36.0	
4.00	40.0	
4.50	45.0	
5.00	50.0	
5.60	56.0	
6.40	64.0	
7.20	72.0	
8.00	80.0	
9.00	90.0	
10.00	100.0	

An application where a compact drive is necessary is where two gearmotors are used to drive a winder in a paper mill. The center distance on the driving rolls is such that the usual type of drive could not be used. These gearmotors employ wound rotor induction motor parts combined with a single reduction in the gearing parts of approximately 5 to 1. The output shaft is offset from the motor shaft. The gear case has been so designed that it can be rotated on the motor frame and the output shaft may be in any one of four positions. By choosing two of these positions and staggering the motor frames, a compact drive is obtained.

Another example is a shovel used to load limestone into cars after it has been blasted from the face of the working room in the mine. Electric driven shovels were previously employed where the ceiling heights were 13 feet or more, and compressed air was used for ceiling heights from 11 to 13 feet. A gearmotor driven shovel can be used in rooms with 11-foot ceilings and has replaced the compressed air shovel. In addition to its compactness, this gearmotor driven shovel will load 30 per cent more limestone in a given time than was previously possible with the compressed air.

A 75 horsepower, 22 revolution per minute gearmotor is used for a dredge cutter drive and coupled directly to the cutter shaft. Splash-proof motor parts are used and the oiling system for the gears has been arranged so cutter shaft can operate from horizontal to a maximum of 50 degrees below the horizontal. The bearings on the output shaft of the gearmotor absorb the thrust from the cutter.

The rugged construction of gearmotors is illustrated by a 1½-horsepower gearmotor used to obtain bridge motion on a small crane. Here a micarta pinion mounted directly on the output shaft of the gearmotor transmits power to crane wheels through a countershaft. Previously a large platform had been required to support the motor and open type spur gears used in this drive. This gearmotor has been in successful operation for more than six years.

An attempt has been made to show a few typical cases indicating the large field of application for gearmotors. There appears to be a definite trend to this type of drive for economical power transmission. Many gearmotors have been in successful operation for upwards of ten years with no appreciable signs of wear and with low maintenance expense.

♦

Scale Resistance of Cast Iron Measured

■ An investigation was made recently by A. H. Dierker and H. H. Dawson, research engineers, Engineering Experiment station, Ohio State university, Columbus, O., to develop an accurate method of measuring growth and scale resistance of cast iron, with a view to conducting comparative tests of irons having different compositions.

Results of this investigation are outlined and tests described in Bulletin No. 100, which may be obtained direct from the university for 25 cents.

Small-Plant Purchases Can Be Systematized

■ PROCUREMENT of materials, supplies, machines, tools, and services for a business is the primary function of its purchasing department. This is not all, however, according to W. C. Zinck, North & Judd Mfg. Co., New Britain, Conn., in a paper presented at the Providence, R. I., meeting of ASME in October.

Purchases must be made at a cost consistent with economic conditions surrounding the material purchased and safeguarding the standard of quality and continuity of service. Furthermore, purchases must be controlled because sales at a profit in a competitive field cannot be made unless materials being used in manufacture are bought at a cost as low as that enjoyed by competitors and because investment in inventory must be kept at a minimum.

Average Cost is Basis

This control of purchases in a small plant may be secured by making an analysis by weeks and months of the procurement and disbursement averages for the past three years. Based on these figures, the purchasing manager asks three or more suppliers to submit bids for all the materials to be supplied as needed. It is felt that the penalty exacted for buying in small quantities is negligible in a small plant. If possible, a supplier should be small because his relations with the small plant are more flexible and the quantity of business more desirable than would be the case with a large supplier. Close co-operation between the supplier and purchasing department will permit the mutual development of a satisfactory schedule of supply. The only objection to this plan is that some suppliers will balk at supplying free warehouse service for the small plant, but this matter is conveniently forgotten when and if the supplier obtains the order.

All companies, big and small, should have a budget to control expenses. Records must be set up so inventories of different classes of materials can be controlled. Basis of this record is the financial principle that no invoice shall be passed for payment unless checked as to whether the material specified has been actually received. Consequently, as complete a stock record can be kept as the value of the item warrants—from a complete perpetual inventory to a mere entry of a receipt.

But purchase records alone do not provide budgetary control. It is also necessary to compare the amount spent against the figure set up in the budget and to compare the quantity bought with the amount used in operations. This is particularly true in a plant manufacturing a multitude of items of various sizes, shapes, and styles from many kinds of materials, depending on the purchaser's specifications. However, an examination of previous years' figures will show that the law of averages holds true and that the proportion of total purchases to the total sales does not vary to any great extent. Consequently, all the purchasing agent has to do is to keep the expenditures for purchases within an established percentage of the sales.

Based on experience, economy is obtained by having the purchasing department exercise control over the raw materials and supplies through stock room records which are under its supervision. But since the different items making up the total sales will vary in style, size, and materials from season to season, even though sales figures remain the same, the purchasing agent will need more than his stockroom records to guide him in his purchases in order to keep within the budgetary allowances and to have the necessary materials on hand when required.

It has been found by analysis that some items can be expressed approximately as a percentage of the plant production pay roll or a department production pay roll, such as iron foundry. This is based on the assumption that for every dollar spent for productive labor, quantities of material and supplies of a definite value have been used.

Cumulative differences between placements and budget, and placements and disbursement items have been determined. If placements exceed budgets or disbursements exceed placements, the entries are posted in red.

•

Test Building Material For Structural Strength

■ In connection with the national bureau of standards' recent program on determination of the structural properties of low-cost house constructions, Insulated Steel Construction Co., Middletown, O., submitted 30 specimens representing its Frameless-Steel construction for walls, partitions, floors and roofs.

Various types of loads were applied to these specimens, and deformation measured for uniform increments of load up to maximum. Results of these tests are described and graphically illustrated by tables in Report BMS9 of the bureau, prepared by H. L. Whittemore, Ambrose M. Stang and V. B. Phelan. Copies of this report are obtainable from the superintendent of documents, Washington, at 10 cents each.

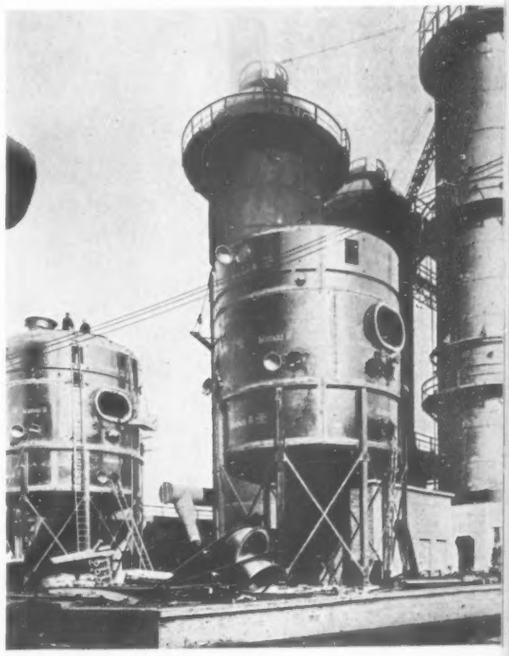
Low Alloy Steel Used in New Gas Cleaning Unit

■ A typical example of how steel producers are themselves taking advantage of improved properties obtainable from low alloy steels is a recent installation of equipment for cleaning blast furnace gases.

This consists of a scrubbing tower and two electric precipitators made from Mayari R steel, where the weight reduction made possible by the higher strength of this material plus increased life insured by higher corrosion resistance justified its slightly higher first cost.

Scrubbing tower shown in the accompanying illustration was constructed of ⅜ and ⅝-inch plate to provide a reduction of 38,000 pounds or 22.2 per cent. The two precipitator shells were made from 5/16-inch plate and showed a weight reduction of 8500 pounds or 16.7 per cent for each precipitator.

Gas cleaning unit for blast furnace gas is made from Mayari R steel. Photo courtesy Bethlehem Steel Co., Bethlehem, Pa.



● Would you be interested in preventing corrosion of equipment?

Here's where ACE RUB

How to Avoid Failures

Ace rubber lined steel tanks for automatic plating of bright nickel by Seymour process. Installed at Fitzgerald Mfg. Company, Winsted, Conn. plant.

Catalogue

60 pages of information and illustrations. Sent on request. Write American Hard Rubber Company, 11 Mercer Street, New York, N.Y.

re

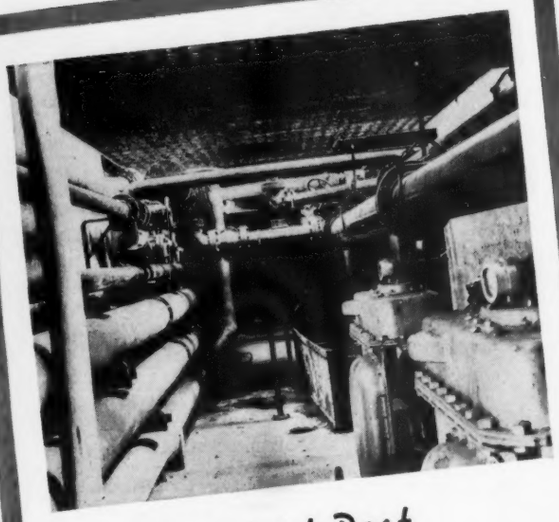
UBER PROTECTION

does just that!

Performance records of thousands of installations of Ace hard rubber and Ace rubber lined equipment prove how Ace Protection prevents corrosion.

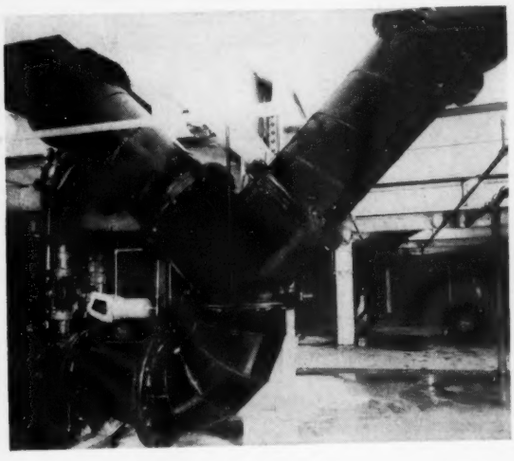
Discover how much you can save in *your* plant . . . in avoiding repairs and replacements . . . in reducing costs.

Write American Hard Rubber Company, 11 Mercer Street, New York, N.Y., Akron, Ohio . . . 111 W. Washington Street, Chicago, Illinois.



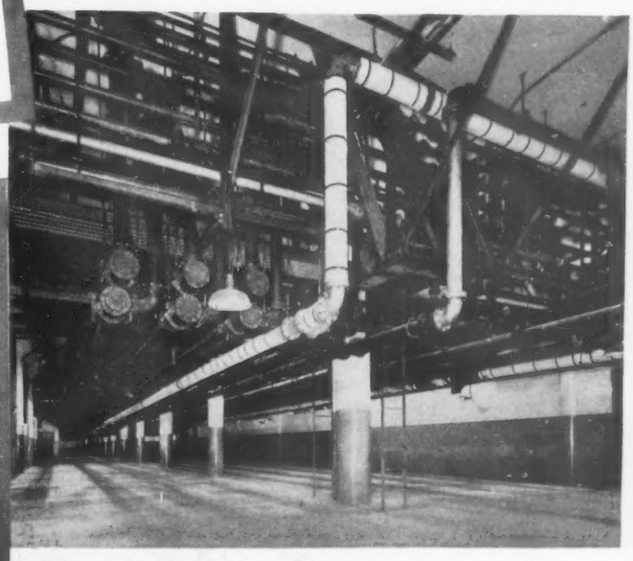
An Important Part

Installations of thousands of feet of Ace rubber lined pipe are not exceptional and the picture above shows equipment at Coney Island Disposal Plant, Sheepshead Bay, N. Y.



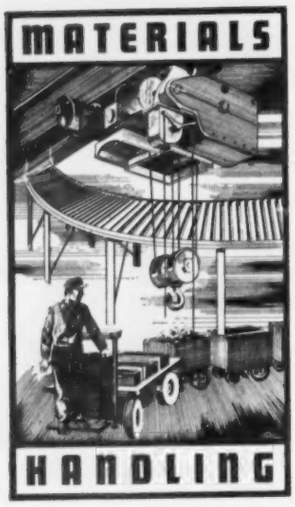
Think of It!

Ace rubber lined pipe available for handling spent acids from pickling vats. Larger sizes than the 24 inch shown can also be had. 42 inch pipe lines not unusual.



Good Engineering

. . . **plus ACE HARD RUBBER EQUIPMENT.** The above installation includes over 12 miles of solid Ace hard rubber Pipe in a Rayon Manufacturing plant. Many of the solutions are similar in strength and temperature to those handled in steel mills. Our wide experience is available to determine when solid Ace hard rubber or Ace rubber lined steel equipment best meets your needs.



Truck and Bus Frames

Cranes with special carriers are used to move long narrow steel sheets through pickling, cleaning and manufacturing operations. Mechanized handling promotes maximum efficiency in production of automotive frame structures

■ AN EFFICIENT system for handling steel in unwieldy specifications by which much of the hand labor for its workers is eliminated or lightened has been developed by Parish Pressed Steel Co., Reading, Pa., maker of truck and bus frames.

This company has specialized for many years in the production of heavy frames for large trucks and buses and in the last few weeks has gone into the fabrication of light truck frames on a production basis with the establishment of a new assembly line which is fitted neatly into the handling system. The company also produces passenger car frames and a general line of stampings for the railroad and other fields but this article will be confined to the problems involving the handling of steel for truck and bus frames.

Steel required for truck and bus frames falls into two classifications, the first including alloy and high carbon grades for side frames and the second the usual low carbon grades for cross members and brackets. The first classification presents a comparatively difficult handling problem in that it has been found most economical to purchase the material in widths sufficient only for one, two or three side rails. Steel for these rails ranges 14 to 52 inches in width and up to 400 inches long. It is 5/32 to ⅜-inch thick. Cross member and bracket material presents little or no difficulty since it is purchased in sizes readily handld with skids and lift trucks.

The plant is divided into four main bays extending approximately north and south. Passenger car frame production is concentrated in the east bay, while the second bay is occupied largely by presses for smaller stampings, including truck cross members and brackets. Alloy and high carbon steels for truck and bus frame side rails are received in the third bay, annealed and formed. The fourth or west bay is devoted to final assembly operations. It also includes the shipping department. A wing running at right angles to the third and fourth bays at their southern extremities, the "South" wing, incorporates the heat treating and cleaning departments. A second wing, adjoining the fourth or west bay at about the center, houses the receiving and pickling departments for steels designed for cross members, brackets and miscellaneous parts. This is the "West" wing.

Steel for side rails is switched into the north end of the third bay in open railroad cars. This bay is

Fig. 1. (Upper)—Handling siderail sheets with a boom on a 10-ton crane. Sheets are 306 inches long. Fig. 2. (Lower)—Here siderails are being moved in a carrier on a 5-ton crane

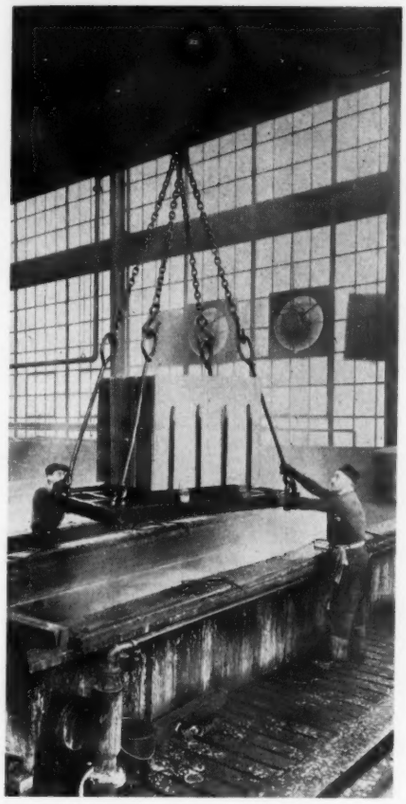


Fig. 5—Showing how sheets are handled in the pickling room with a sling from a 10-ton crane

equipped with three 10-ton overhead cranes and the steel therefore is bundled in units of 8 to 10 tons. As previously indicated, side rail steel is unwieldy due to its shape and it has been found that units of this size may be handled most easily.

Parish engineers designed a simple carrier for handling this material. It was constructed from an I-beam approximately 15 feet long to which were attached three evenly spaced steel rings, thus facilitating a simple chain hitch arrangement. The beam may be quickly picked up by any one of the three overhead cranes by hooking into a hitch at the top.

As indicated in Fig. 1, the incoming steel may be unloaded quickly with this simple I-beam carrier and temporarily stored adjacent to the switch or transported immediately to a 100-ton furnace approximately in the right center of the same bay where it is annealed dead soft. The steel is piled on the furnace platform in the same 8 to 10-ton units.

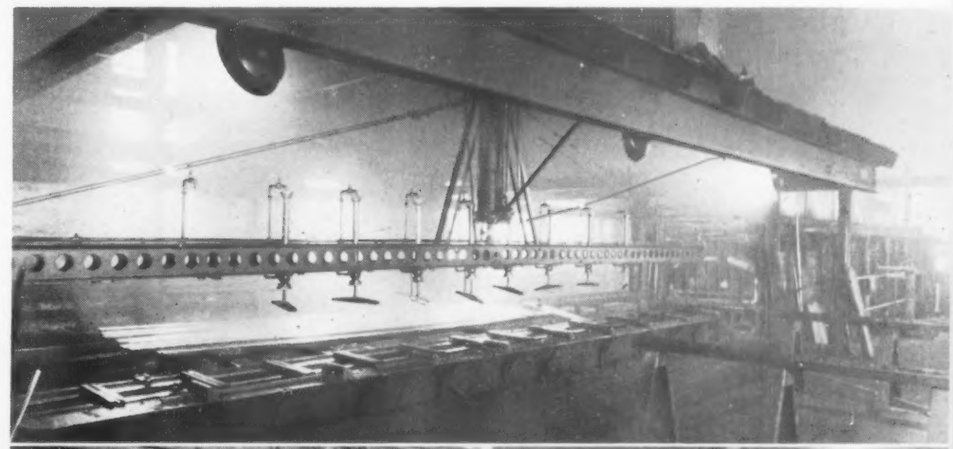
After annealing, the steel is picked up by the I-beam carrier and moved to the north left center of the bay where the plates are blanked on a crank press. Following this operation, the blanks are shifted, still in 8 to 10-ton units, to the south right center of the bay where a perforating press punches holes. Inasmuch as the material is still flat, the I-beam carrier again is used for the shift to the extreme south end of the bay where the rails are formed in either a 3300 or 4000-ton hydraulic press, the discharge end of which is in the previously mentioned south wing.

The fully formed rails now are slid into a large basket type carrier with a hitch for the 10-ton crane serving this wing. It should be pointed out that in the case of all three presses, the material is placed by crane immediately adjacent to roller beds so it may easily be skidded in and out by the operators.

Side rails in lots of 12 to 15 are shifted in the pressed steel carriers, shown in Fig. 2, to roller tables at either end of the oil fired, heat treating furnace. This furnace is positioned at the right center of the south wing and material may be fed into it from either end. Long, narrow quenching tanks are located parallel and immediately adjacent to the roller tables serving the furnace so treated rails may be slid out of the furnace and readily immersed. The quenching itself is facilitated by a device actuated by a hydraulic ram developed by Parish engineers. The rails are held in place by a series of pneumatically operated clamps, shown in Fig. 3.

Following heat treatment, the rails, still in lots of 12 to 15, are checked for hardness in a brinell machine conveniently located near the roller tables. Rails meeting the necessary physical requirements are slid into a carrier and moved by crane to the sand blasting machine in the lower right hand corner of the south wing. Additional roller tables are used here to slide the rails in and out of the cleaning machine. After the cleaning operation

(*Please turn to Page* 66)



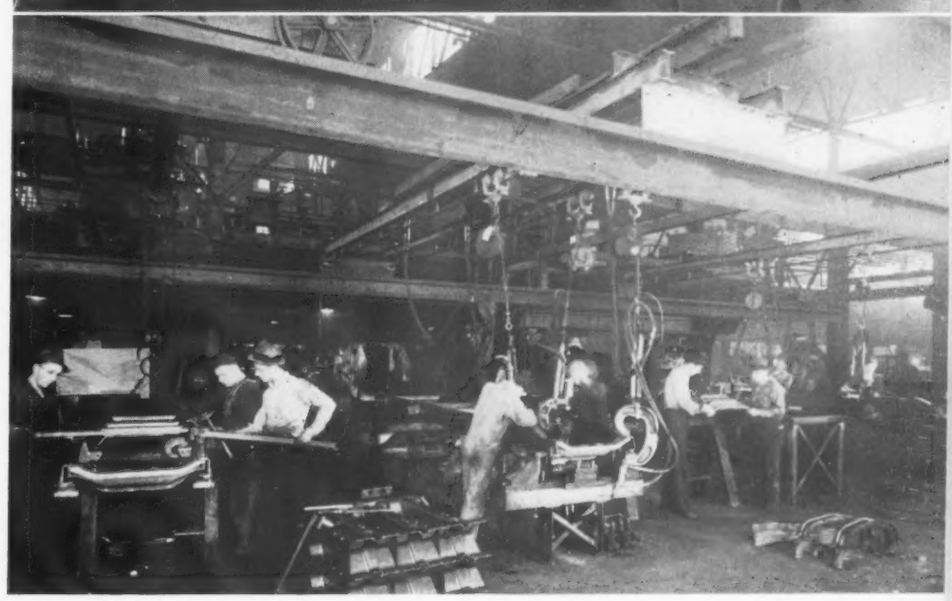
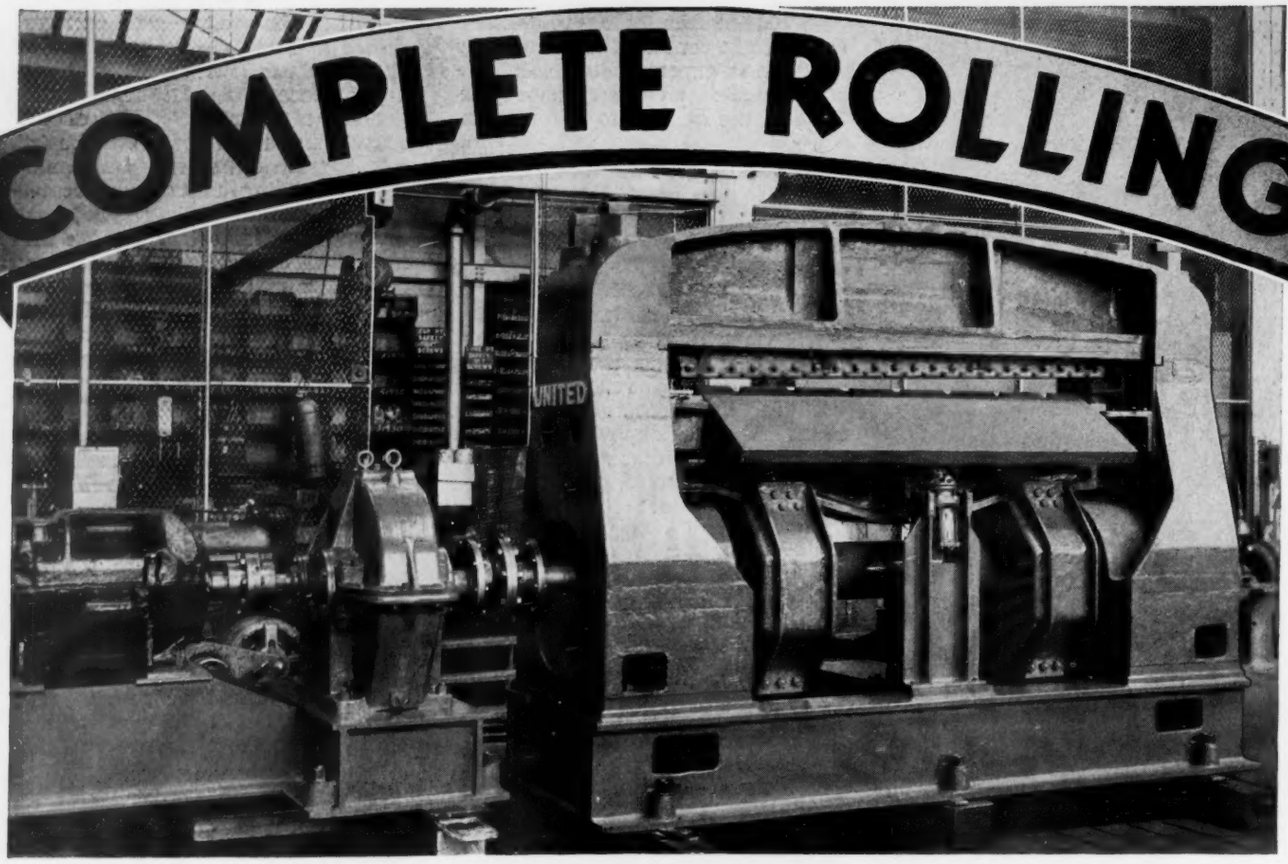
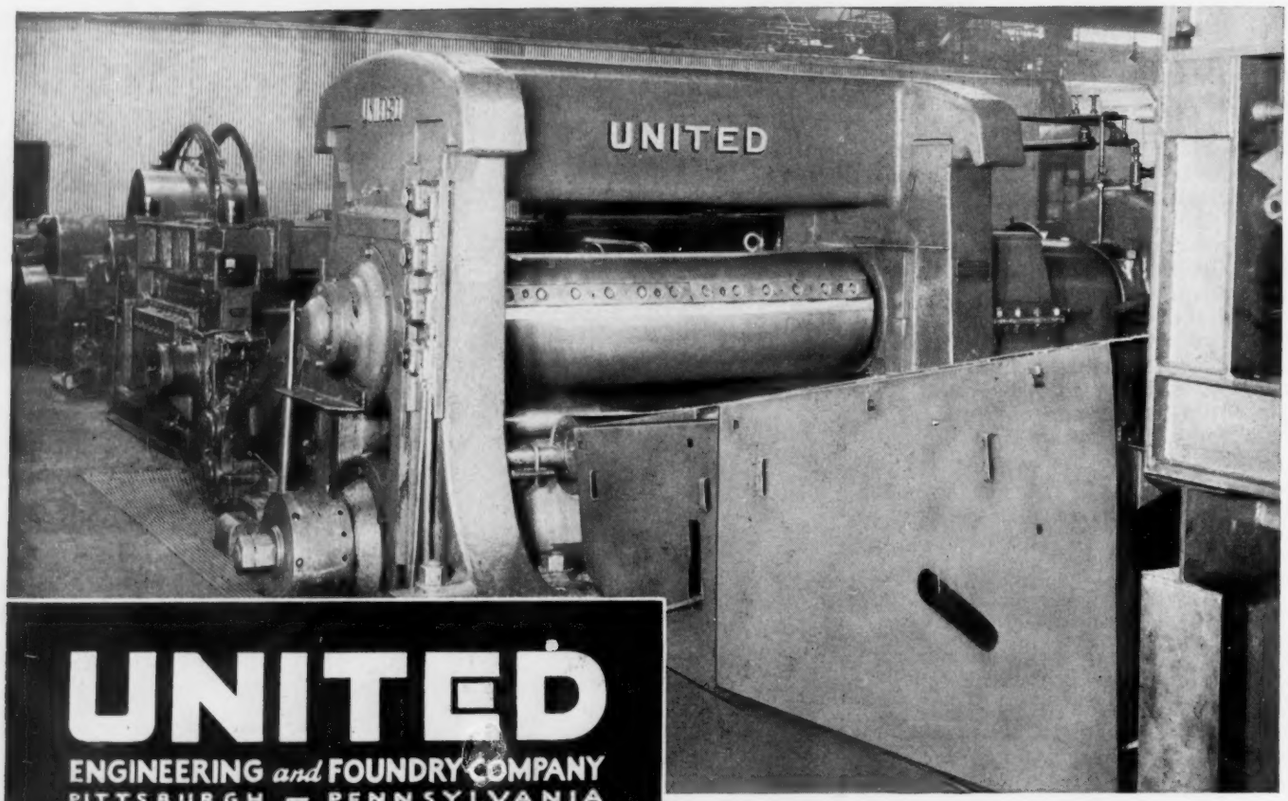


Fig. 3. (Upper)—When siderails come from heat-treating furnace at right, the automatic clamp show here holds them while being immersed and agitated in oil quenching tank. Fig. 4. (Lower)—Here truck frames are assembled. From left to right, riveting brackets on side rails, assembling cross members and placing rivets in holes, riveting with yokes on a fixture, finishing and checking

COMPLETE ROLLING



98" Upcut Shear for Strip

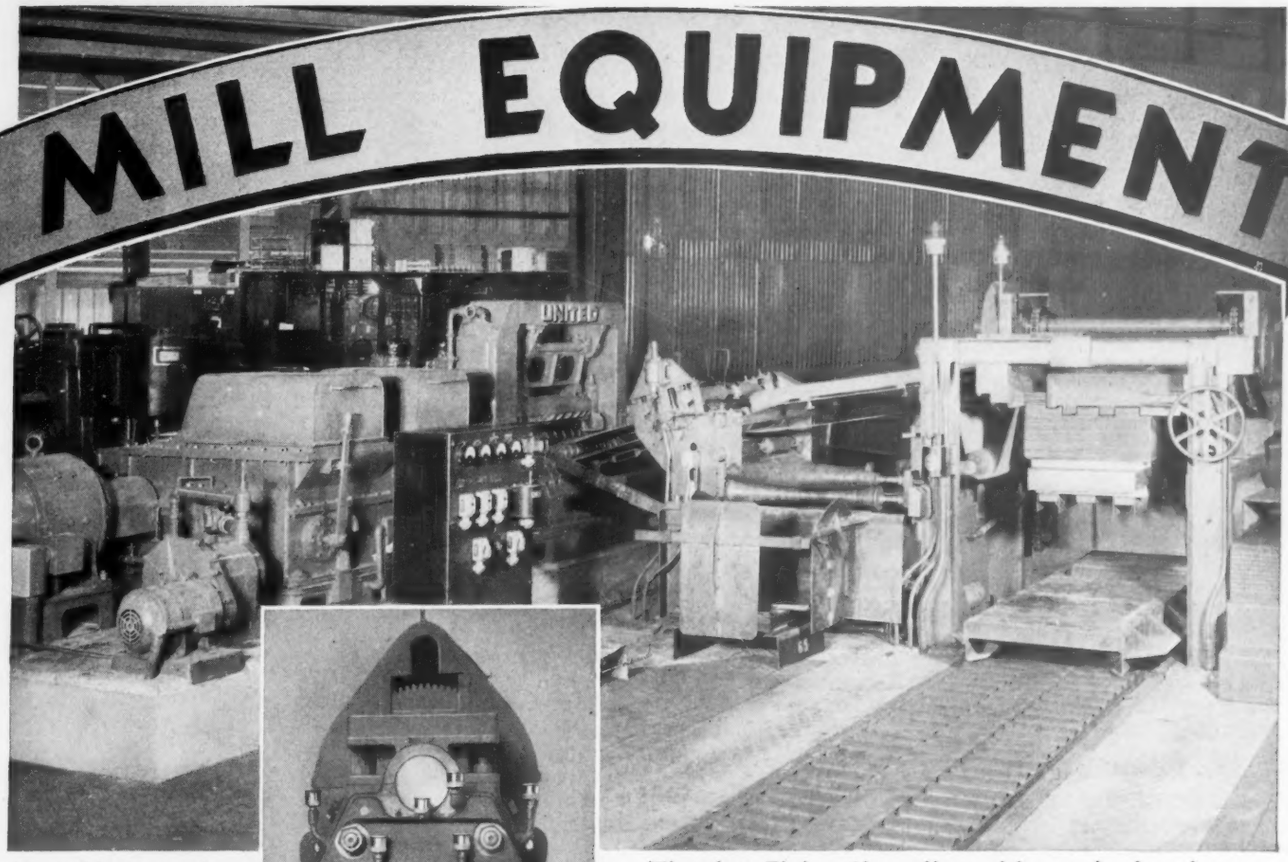


Drum type Flying Shear line

UNITED
ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

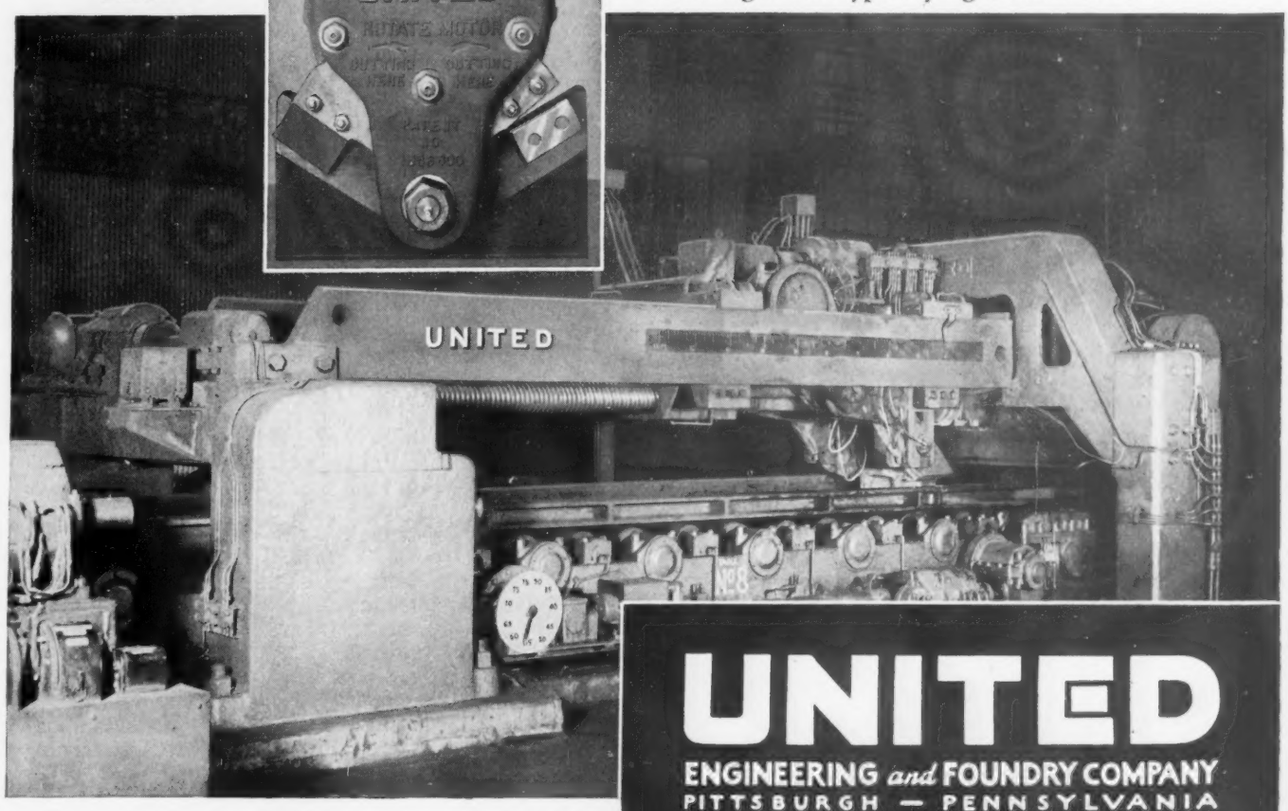
ASSOCIATED COMPANIES: DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND · DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q.

MILL EQUIPMENT



Portable Cropping Shear

Tin plate Flying Shear line with standard reciprocating crank type Flying Shear and Classifier



Down and Upcut Shear for Blooms and Slabs

UNITED
ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

ASSOCIATED COMPANIES: DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND · DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q.

Automatic Carbon Arc

Automotive manufacturers find electronic tornado process has many advantages for high production welding. Special fixtures are an aid in obtaining maximum benefits

By F. M. MAICHLE
Lincoln Electric Co.
Cleveland

■ WELDING with the automatic, shielded, carbon arc is a widely accepted method for fabricating various automotive parts. In that industry where production is sufficient in amount and of relatively uniform character, this process provides extremely low fabricating costs and welds in all cases equal to or better than the requirements of the design.

High quality and low costs have resulted largely from the electronic tornado system of controlling the arc by superimposing a strong magnetic field on the arc stream. This magnetic field checks tendency of the arc to wander and causes a rapidly gyrating motion of the electrons which in turn refines the molten metal. It is this swirling motion of the electrons which gives the electronic tornado its name.

Abstract from paper presented at annual meeting of American Welding society, Detroit, Oct. 17-21, 1938.

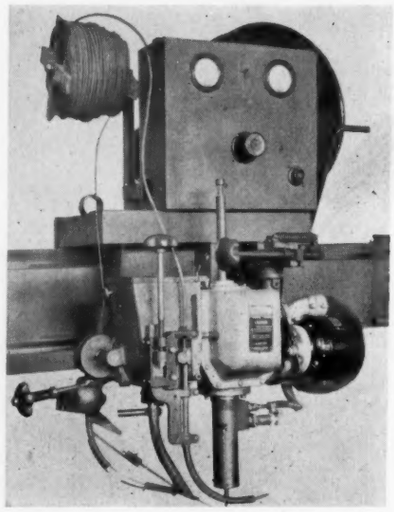


Fig. 1—Electronic Tornado automatic carbon arc welder showing elements

As weld metal is simply melted by heat from the arc at point of deposit, no metal passes across the arc, and oxygen and nitrogen of the air have less opportunity to combine with the molten weld metal. The point at which fusion takes place is protected from the atmosphere by introduction of an autogenizing element which burns in the arc to liberate gasses which provide an atmosphere void of oxygen and nitrogen around the weld metal. As the weld metal cools, protection is maintained by a layer of slag formed over the weld.

The automatic welding head, Fig.

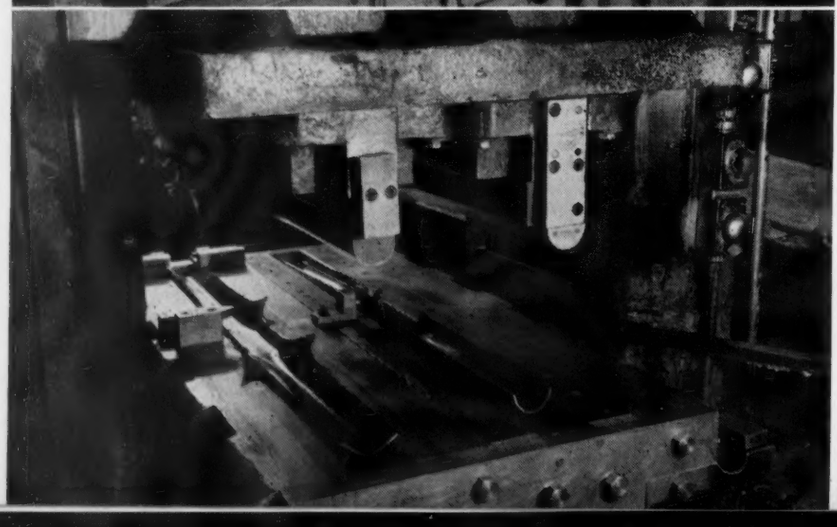
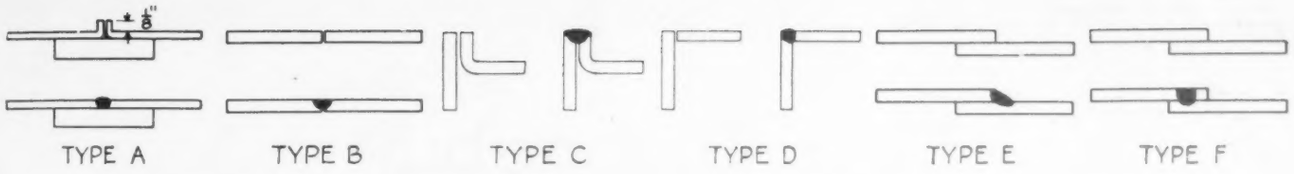


Fig. 2. (Top)—Forming operations on rear axle housing. Fig. 3. (Below)—Final forming operations on same product



BUTT WELDS — TYPE A

THICKNESS OF METAL	20 Ga	18 Ga	16 Ga	14 Ga
Welding Speed, Feet per Hour	140	140	135	125
Cost per Linear Foot of Weld	.009	.009	.010	.011

BUTT WELDS — TYPE B

THICKNESS OF METAL	14 Ga	12 Ga	10 Ga	3/16"	1/4"	5/16"	3/8"
Welding Speed, Feet per Hour	300	260	180	150	120	100	75
Cost per Linear Foot of Weld	.005	.006	.008	.013	.016	.019	.024

EDGE WELDS — TYPE C

THICKNESS OF METAL	20 Ga	18 Ga	16 Ga	14 Ga	12 Ga	10 Ga	3/16"	1/4"
Welding Speed, Feet per Hour	250	225	200	185	170	150	140	135
Cost per Linear Foot of Weld	.005	.006	.007	.007	.008	.010	.012	.012

CORNER WELDS — TYPE D

THICKNESS OF METAL	18 Ga	16 Ga	14 Ga	12 Ga	10 Ga	3/16"
Welding Speed, Feet per Hour	130	130	130	115	110	90
Cost per Linear Foot of Weld	.009	.009	.009	.012	.017	.018

LAP WELD — TYPE E

THICKNESS OF METAL	18 Ga	16 Ga	14 Ga	12 Ga	10 Ga	3/16"	1/4"	5/16"	3/8"
Welding Speed, Feet per Hour	150	135	125	110	100	90	70	50	40
Cost per Linear Foot of Weld	.008	.010	.011	.016	.016	.018	.022	.031	.038

PLUG WELD — TYPE F

THICKNESS OF METAL	16 Ga
Welding Speed, Feet per Hour	75
Cost per Linear Foot of Weld	.011

Fig. 4—Speeds and costs of various types of automatic welds

1, holds a carbon welding electrode, automatically strikes the arc, automatically feeds the electrode to maintain a constant arc length and also rotates the electrode to maintain a symmetrical point. An electromagnetic feature controls the arc flow and provides electromagnetic forces for agitating or working the weld metal while it is molten. This facilitates the exodus of nonmetallic inclusions and gasses from the weld metal.

Most of the control equipment is of a commonly used type and no description is necessary. However, a special differential relay and time-delay switch are used. Differential relay consists of an armature operating a set of contacts and suspended on flat springs to float them freely inside a set of differential coils. Coils at left are connected across the arc, coils at right across the constant potential circuit through an adjustable rheostat. This rheostat permits setting the voltage across the right-hand coils to any desired value up to 50 volts.

The two sets of coils are connected in opposition. When the arc voltage is exactly equal to the reference voltage, the armature remains in its central position and neither contact is closed. When arc voltage exceeds the reference voltage, the armature swings to the left, closing the contacts, energizing the down-feeding brake coils in the head to shorten the arc till its voltage is just equal to the reference voltage.

If the arc voltage is less than the reference voltage the relay swings to the right, energizing the up-feeding brake coils, causing the arc to be lengthened until the arc voltage is equal to the reference voltage. Differential relay thus maintains a constant arc length. A time-delay switch allows proper establishing of the arc at start of the weld.

In some applications, the welding head travels while the work remains stationary under it. In other applications, welding head remains stationary while work moves under the carbon arc. Here a fixture holds the welding head at proper distance from the work while another fixture moves the work along under the arc.

Many Types of Joints

One type of butt-weld, Fig. 4-A, has edges of the plate turned up making additional filler metal unnecessary. The work may or may not be clamped in position on a copper backing strip but the welds made are with 100 per cent penetration. Type of butt-weld used in the automatic welding of rear axle housings, generator frames and many other products is shown in Fig. 4-B. Here seams are clamped tightly together without backing and no filler metal is added.

Fig. 4-C illustrates edge or corner weld used in making mufflers. It also requires no additional filler metal. Fig. 4-D is type of weld used in the manufacture of rectangular tubing for frames and housings.

Fig. 4-E shows lap-welds used in production of various automotive parts such as hubs, disc wheels, etc. Work is clamped into position without the use of backing. Fig. 4-F shows weld through the lapped plate with sufficient penetration to obtain 100 per cent strength. This application is used in welding inserted tubes as in remote control gear shift assemblies.

Possibly one of the best-known applications is fabricating of automobile starter and generator frames. These are cylinders formed of 5/16 and ⅜-inch steel plate with about 5½ inches of butt-welding on each and welded at a rate of 240 pieces per hour.

Fabricating torque tubes is another common application. Here boxes serve as jigs to hold the tubes while they are propelled beneath the head. The process is continuous, the boxes being loaded at one end, tubes welded, boxes unloaded at other end of travel, returned to starting point, again loaded and so on without interruption.

Torque tubes welded in this instance vary between 48 and 66 inches in length. Thickness of metal

(Please turn to Page 65)

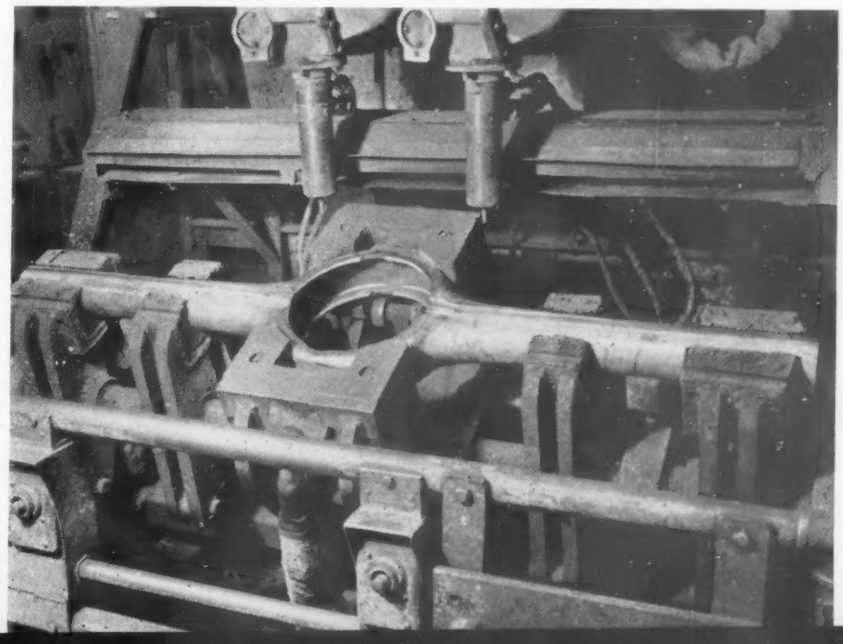
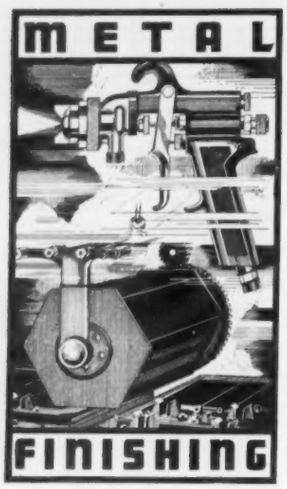


Fig. 5—Rear axle housing in jig ready for automatic carbon arc welding. Two welding heads are used



Cleanability

To facilitate cleaning, manufacturer of food preparing equipment employs baked enamel finishes, color and varnish coats, tinned surfaces and stainless steel

■ IT IS essential that machines used in preparing food, be designed and built to facilitate cleaning all surfaces which the food might contact. In fact, the degree of usefulness of such equipment depends to some degree upon the ease with which it can be kept clean and sanitary.

In food preparing equipment made by Hobart Mfg. Co., Troy, O., this requirement has been handled in various ways. Dishwashers are provided with chambers which have no overlapping seams to accumulate material. Mixer bowls are spun from one piece of material to eliminate joints. Similarly, outside surfaces which may be contacted by food being prepared also receive a finish which aids in making the surface easily cleaned.

The group of slicers shown in Fig. 1 illustrates the Dulux finish used on many of the outside surfaces of Hobart food machines. These slicers have no holes, cracks or crevices in which food may lodge. Both sides of the knife are quickly and completely accessible for cleaning. Entire machine can be quickly cleaned without use of any tool. All exposed metal parts are constructed of stainless steel or alumnite.

Similarly, all other Hobart food machines are designed to facilitate cleaning.

Prior to application of the Dulux finish, castings which have been ground and sanded proceed through the industrial type washer shown in Fig. 3. This is a continuous machine through which the work moves on a slat-type conveyor. It includes several rinse and wash chambers and drying chamber.

Fig. 2 shows two of the paint spray booths in which the Dulux finish is applied. This room is completely air conditioned. Part of the large ventilator used in the air conditioning system may be seen just above the second booth in Fig. 2. Cases for coffee mills were being handled when this picture was taken. Arranging the booths near the windows assures an abundance of natural lighting during spraying. In addition a large floodlight in each booth furnishes artificial illumination when necessary. After the Dulux finish has been applied, the work is baked for 30 minutes at 300 degrees Fahr. in ovens shown in Fig. 4. Of course the time and temperature varies somewhat with different items.

As will be seen, work is loaded in and out of the ovens on racks. Ovens are gas-fired and include automatic temperature control equipment which records and regulates oven temperature through the baking.

In addition to the Dulux finish, other finishes are employed, such as the French gray finish used on the

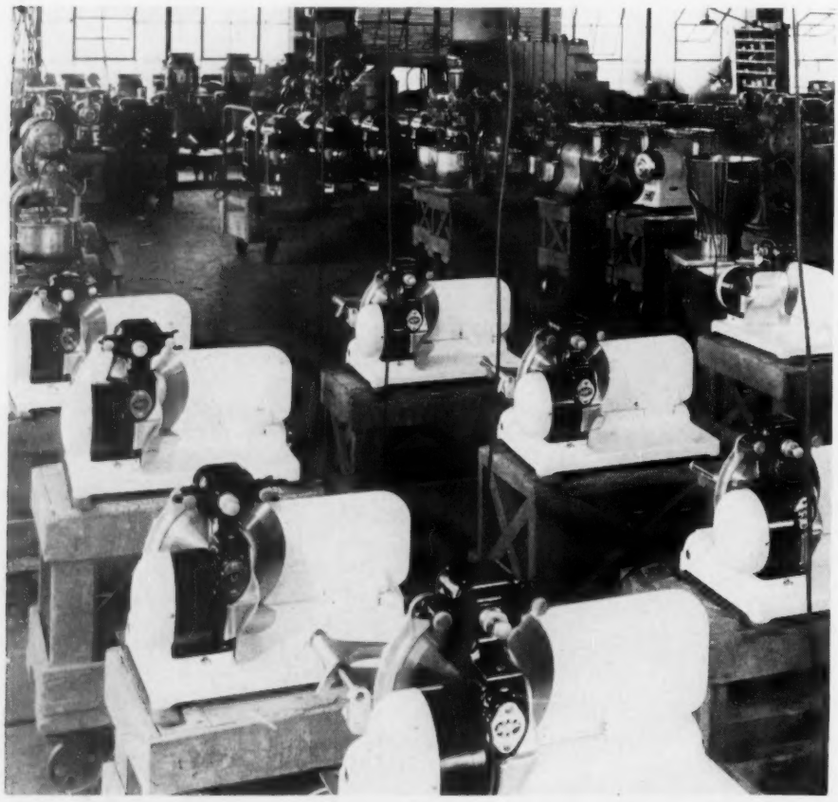


Fig. 1—Meat slicers on test. Stainless steel knives and Dulux finish are used in this equipment

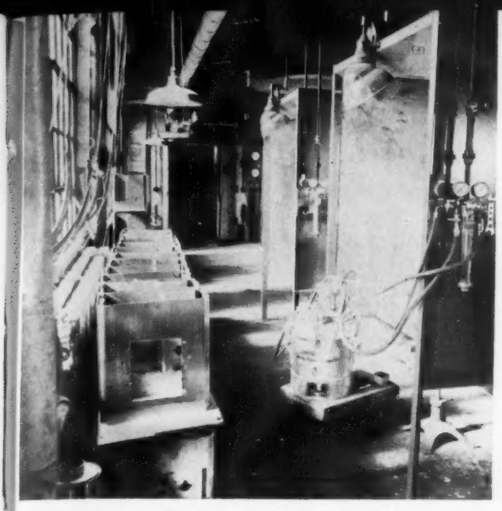


Fig. 2—Paint spray ovens where Dulux finish is applied

wide line of Hobart mixers which are made in capacities from 10 to 110 quarts. In applying this finish, five coats are given the equipment in the following sequence:

After the priming coat has been applied, the equipment is given a filling coat. This is followed by a sanding operation, a refill coat, another sanding and application of the first color coat. Next is the color varnish coat, striping and application of clear varnish coat. In several models the machines receive a total of six coats, the last of which is a clear spar varnish.

Tinned Coating Applied

To assure easily maintained sanitary conditions, whips, beaters, food cutters, chopper parts, exterior parts, mixing arms and dough beaters—all receive a tinned coating.

This work is handled in the tin plant where 20,000 pounds of tin are kept under heat. It is necessary to have a large volume of tin in a molten state since any article to be coated must be entirely immersed. As an example, an 80-quart mixer bowl must be placed in a bath of tin weighing approximately 4400 pounds. Prior to tinning, articles are carefully prepared by cleansing them in several chemical and clear water washes, in the case of steel parts. Articles of cast iron are sand blasted and cleaned in a tumbling barrel before being immersed in the bath of tin.

The tin plant uses about 50,000 pounds of tin each year in connection with tinning 273,000 pounds of steel parts and 391,000 pounds of cast iron items. The tin coating assures a surface that will not contaminate the food it contacts. It also is quite easy to clean and of course assures against corrosion.

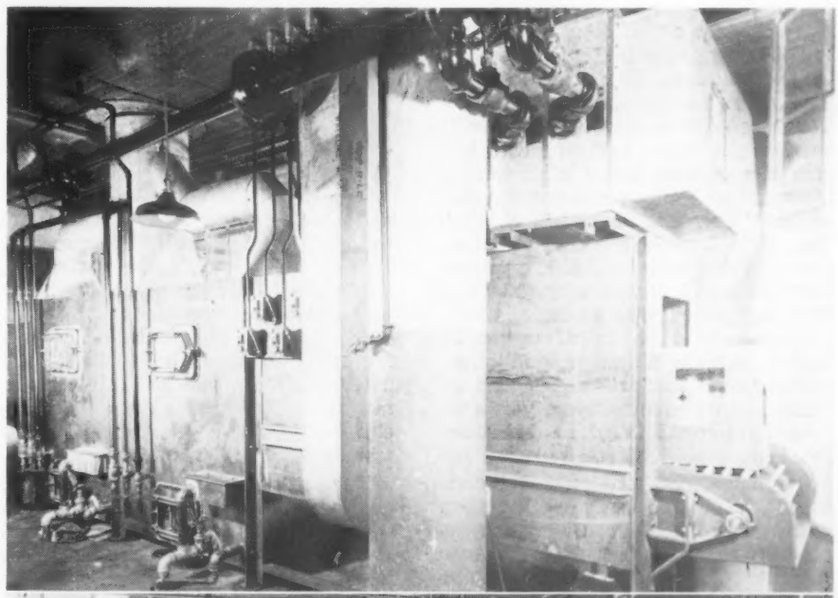
Another development which permits increased cleanliness has been introduced in Hobart meat slicers. This is the use of stainless steel for the rotary slicing knife. Conventional slicers utilize knives of high-carbon steel heretofore believed necessary to assure maintenance of the desired sharp cutting edge.

However, the heat-treating department of this plant has been successful in developing a method of hardening stainless steel slicer knives. These are received in the form of circular disks the diameter of which varies according to the size of the slicer. The knife is first ground on a coarse grinding wheel, finished on a fine grained wheel and polished.

In the heat-treating department the knives receive extremely careful attention as hardening stainless steel is quite delicate work. The knives produced have been found to keep their edge over much longer periods than was originally expected. In fact many slicers have been in use as long as a year before it was necessary to resharpen the knife.

New Inhibiting Rubber Primer Is Developed

■ Rust-Eeter is a chemical treatment recently developed by Harrington Paint Co. Inc., East Cleveland, O., for making rust inert. It is useless if applied over a thick scale or crust of rust. However, if the scale or crust is removed, Rust-Eeter stops its further spread and forms a tough film of rubber over the surface. This rubber film has great tensile strength and is said to provide a sound foundation for finish coats.



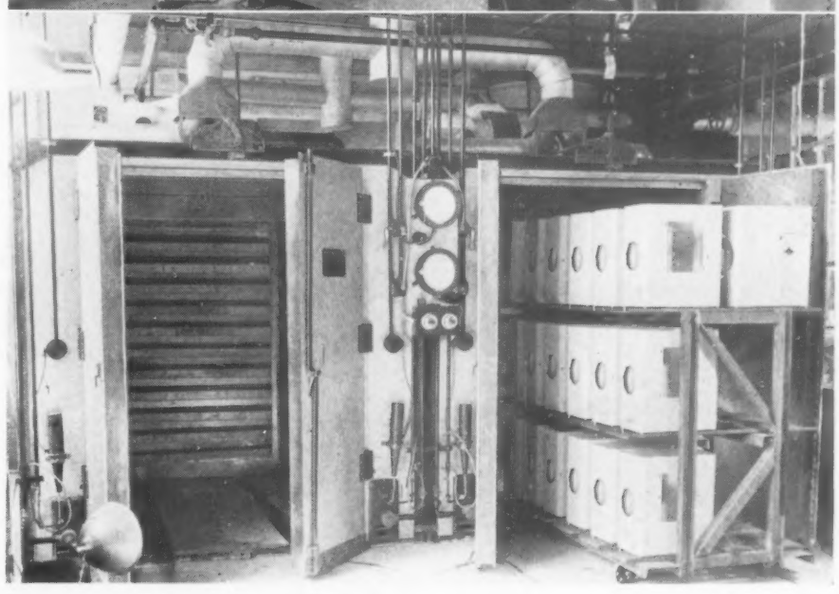
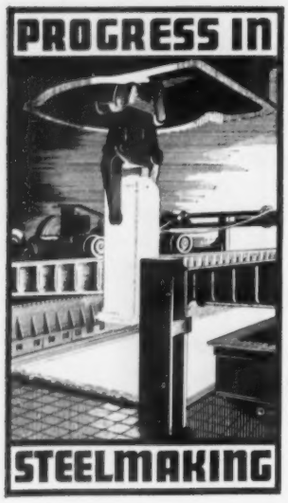


Fig. 3. (Top)—Industrial type washer through which items pass to assure complete removal of all grease and dirt. Fig. 4. (Below)—Automatic controls and recording instruments aid uniformity in baking the Dulux finish



New Hot Mill

With output of 600,000 tons annually, new continuous mill is important addition to rolling mill capacity. Rolls strip from 18 to 77 inches wide, 18 gage to ¼-inch thick. Sheet is hot sheared at end of line in lengths from 11 to 30 feet

■ EMBODYING the latest refinements in design and capable of turning out strip or sheet at speeds up to 2000 feet per minute, the new 80-inch continuous hot strip mill recently erected at Irvin works by Carnegie-Illinois Steel Corp. will handle not only carbon steel but also the various other high tensile steels now being produced by the corporation, such as U. S. S. Cor-Ten, Man-Ten, Sil-Ten and stainless steel. Strip will be rolled ranging from 18 to 77 inches wide, 18 gage to ¼-inch thick; 30-inch inside diameter coils will be rolled up to 54 inches outside diameter and sheet will be hot sheared in lengths of from 11 to 30 feet. Capacity is estimated at 600,000 gross tons annually.

Slabs up to 8 x 60 x 240 inches come from the Edgar Thomson works, Braddock, Pa. Separated according to size and analysis, slabs are stored in a 124 x 864-foot building with a slab conditioning bed at each end for removing surface imperfections by oxyacetylene scarfing. Three, continuous, zone controlled, triple fired furnaces with 20 x 80-foot hearths heat slabs at a rate of 60 gross tons per hour each. Two motor-operated slab pushers are used. Slab approach table has a magazine feeder at each end. A reciprocating conveyor returns slabs from mill approach table to storage.

A complete general description of the new Irvin works was carried in STEEL, pages 40 to 43, Dec. 19

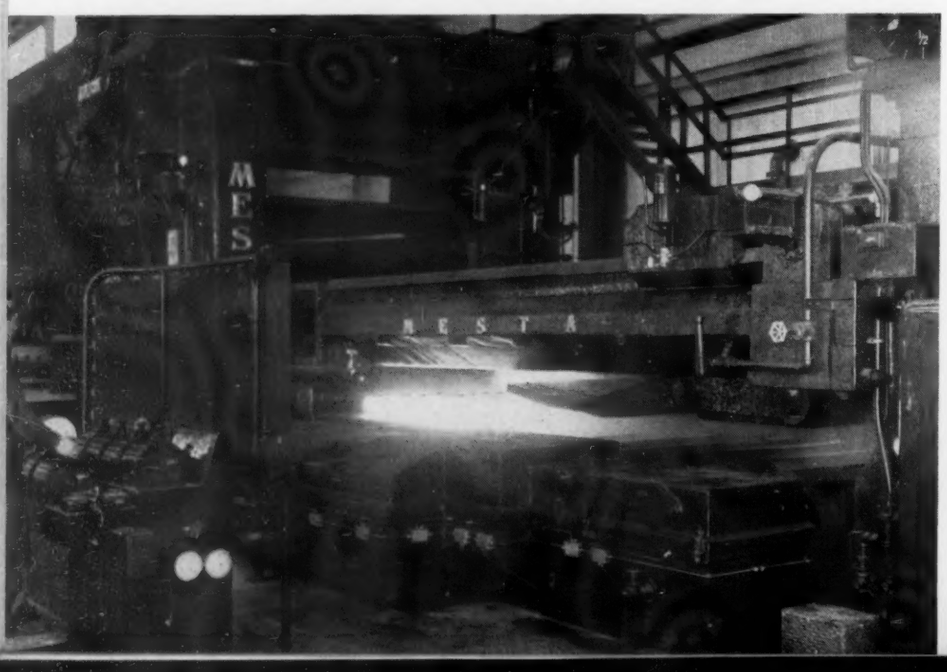
Furnaces normally burn coke oven gas under full automatic control. Carborundum recuperators are used. Waste heat boilers generate 30,000 pounds of steam per hour.

The 80-inch continuous hot strip mill includes: A 2-high roughing scale breaker, a 4-high spreading mill, a squeezer, three 4-high universal roughing stands, temperature control table with two crop shears, one 2-high finishing scale breaker, six 4-high finishing stands, flying shears, runout table, two coilers, piler and scales, as the principal equipment.

Slabs go to roughing scale breaker over a table at from 350 to 419 feet per minute. Roughing scale breaker, a 2 high, 36 x 66-inch stand is followed by hydraulic descaling sprays operating at 1350 pounds per square inch. Next comes the spreading mill with turntables at both sides. This is a 4-high stand with work rolls, 48 x 130 inches, and back-up rolls, 51 x 124 inches, operating as first roughing stand on large slabs or cross rolling slabs up to 10½ feet in length. Slabs cross rolled are turned 90 degrees on the second turntable and go to a squeezer with a 7-inch side stroke.

Pass Second Descaler

Roller tables advance the squared slab through another hydraulic descaler to the second 4-high roughing stand, a universal mill with 38 x 81-inch work rolls and 51 x 76-inch back-up rolls, the vertical edging rolls being 22 x 11 inches. Slab goes at approximately 305 feet per minute to a table which carries it to No. 3 universal-rougher at 400 feet per minute. No. 3 rougher has 36 x 81-inch work rolls and 53 x 76-inch



Slab pusher at broadside mill in new Irvin works of Carnegie-Illinois Steel Corp.

back-up rolls with 22 x 11-inch vertical edger rolls.

The fourth and last roughing stand is also a universal mill. It has 34 x 81-inch work rolls and 53 x 76-inch back-up rolls with 22 x 11-inch vertical edger rolls, discharging through a rotary crop shear at approximately 430 feet per minute to a temperature control table. Rotary shear crops rear end of the strip and can handle material up to 77 inches in width, ⅞-inch thick and 150 feet in length. Temperature control table rollers are cooled by water sprays on under side.

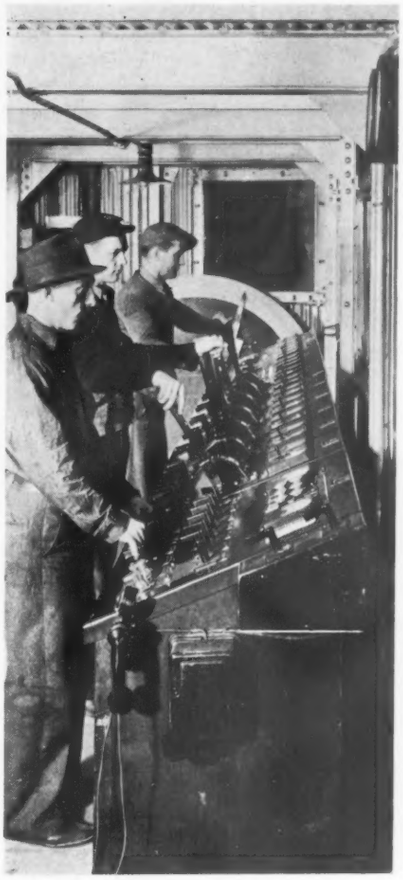
When piece has reached proper temperature for finishing, it goes to finishing scale breaker through a second crop shear, squaring the entering end. This 2-high stand has rolls 25½ x 80 inches. It delivers sheet to the finishing train at from 82 to 330 feet per minute. A double descaling manifold with 1350 pounds pressure on the jets at top and bottom of the delivery side of this mill assures complete freedom from scale.

Six Stands in Finishing Train

Six stands of 4-high mills, spaced 18 feet apart, form finishing train. Work rolls are 27 x 81 inches, back up rolls 54 x 76 inches. Stands have motor driven, adjustable, side entry guides and all except the first have motor-driven looper rolls. Delivery speed increases from 200 to 400 feet per minute at first finishing stand to from 1000 to 2000 feet per minute at the runout table where strip passes a final high pressure descaler.

A rotary flying shear, hydraulically synchronized with the last mill, crops front and rear ends of the strip or cuts it into multiple lengths ranging from 11 to 30 feet. Strip to be coiled goes to one of two internal down-coilers with deflector pinch rolls. These coilers have new type special side guides. Coiler rollers are spring loaded with pneumatic balancing cylinders.

Hot coils discharge into a cradle which sets them on end on a roller chain conveyor. Each coiler has a conveyor. Both deliver coils to a



This is the control pulpit overlooking the finishing train

1274-foot main cooling conveyor advancing cover scales to raw coil storage. Overhead cranes deliver raw coils to pickle lines or tractors take them to hot strip finishing.

Hot runout table, extending 700 feet from last finishing stand to piler, has cast iron rolls, grouped in five operating sections and driven in pairs by direct-current motors. Table speeds go up to 2135 feet per minute.

Sheared sheets pass over coilers to a motor operated, depressing type piler, handling sheet up to 77 inches wide in lengths from 11 to 30 feet and piling to a depth of 26 inches. Chain conveyor moves a finished pile aside so another can be built up while the first is being weighed and taken away.

About 3000 bearings are grease lubricated through automatic or semiautomatic pressure systems, arranged so failure to receive a definite amount of lubricant at any bearing immediately signals the operator.

Descaling system operates at the extreme pressure of 1350 pounds per square inch, pump shut-off pressure is 1600 pounds. The air bottle accumulator, designed for 2000 pounds per square inch, is built of laminated rings to prevent bursting.

Indicate Roll Strain

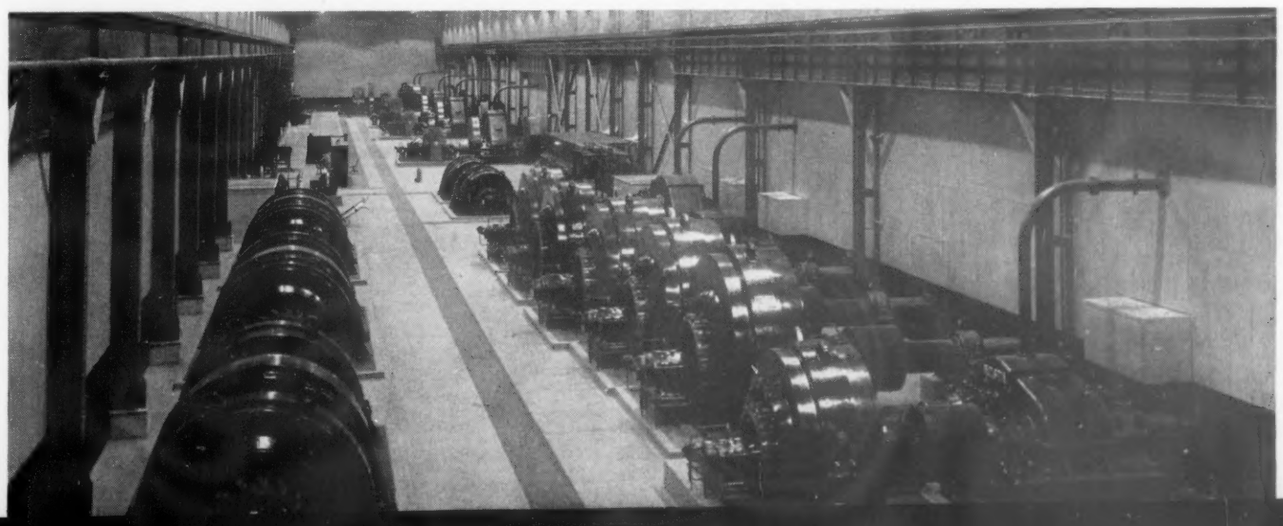
Roll stands have strain gages similar to extensiometers with indicators mounted at control stations. Four recorders with selector switches provide records of any desired group of stands.

Screwdown controls are located on mill housings. Indicators reading in thousandths of an inch are installed at eye level. Side guard adjustments are made independently at each stand. Elevated pulpits include two for furnace charging and one each for roughing train, finishing train, runout tables, coilers and piler.

Three pulpits are installed on the wall facing open side of mill. Roughing train pulpit controlling slab speeds is located 16 feet above floor level opposite No. 2 roughing stand. Finishing mill speeds, loopers, flying shear and crop shear are controlled at finishing mill operating pulpit, 16 feet above the floor level on open side of mill between No. 6 and No. 9 finishing stands. Runout table pulpit is also 16 feet above floor level. Crop shear may also be controlled from the floor.

Six floor stations control tables, crop shears and piler auxiliaries. Two slab depiling stations are elevated to the charging level. Duplex controls have been installed, or provision made for their addition, wherever convenience or safety

General view of hot strip mill motor room at the Irvin works



would be increased by their use.

Pyrometer guns are provided after scale breaker No. 1, over the holding table, before the last finishing stand, and before coiler No. 1, with recorders at furnace heater's station and at the metallurgist's station. Indicators are installed in the floor pulpits at both scale breakers and in the elevated wall pulpit at the finishing mill.

Main mill drives are located in a 65 x 700-foot room, ventilated by filtered air under slight pressure to exclude any dust. It houses main motors, gear drives, motor generator sets and the metal clad switchgear with 51,500 horsepower represented by alternating-current motors, 27,500 horsepower by direct-current motors and 27,000 kilowatts by motor-generator sets.

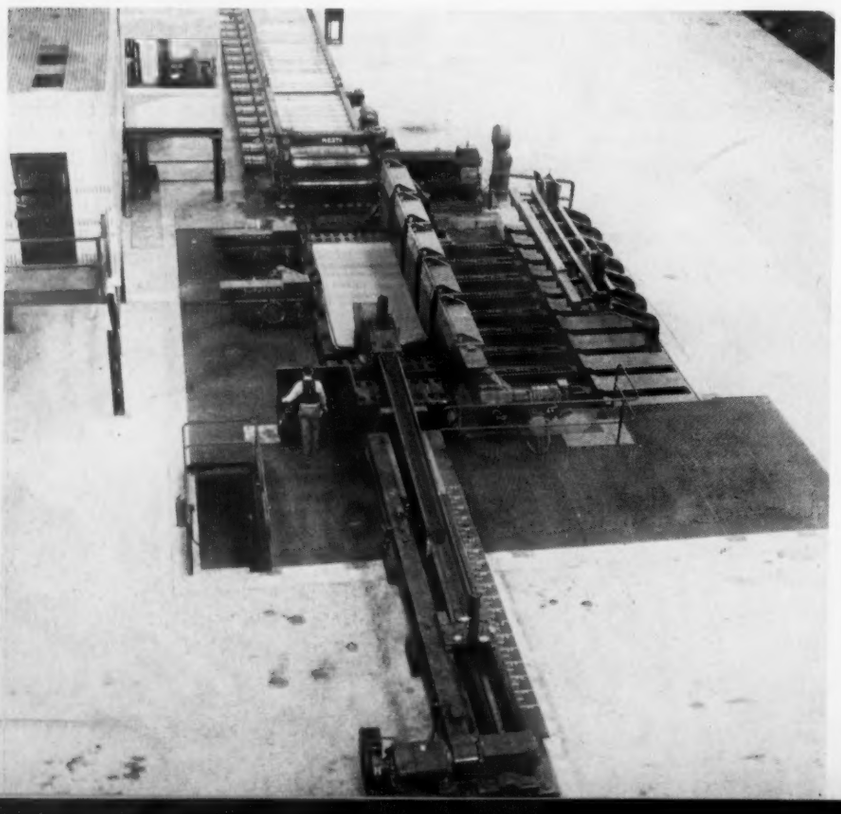
Three, 3 unit, 7000 kilowatt, 600 volt, synchronous, motor generator sets supply direct current to finishing stand motors. Two, 5 unit, 1200 kilowatt, synchronous, motor generator sets furnish current to coiler, flying shear and runout table motors. Two, 1500 kilowatt, 230 volt, motor generator sets furnish direct current to cranes, tables and auxiliary mill motors.

A 1250 horsepower, 6600 volt, 236 revolutions per minute, wound rotor, induction motor with a single reduction flywheel gear drives roughing scale breaker. Next is a 3500 horsepower, 147 revolution per minute motor and flywheel with gear reduction for the spreading stand, followed by three 3500-horsepower units driving No. 2, 3 and 4 roughing stands at 254, 396 and 396 revolutions per minute respectively, all with flywheels. Motors for the first scale breaker and spreading stand are equipped with magnetic secondary controls, while slip regulators are used with third and fourth roughing stand motors.

Finishing train motors and controls are conventional 600-volt, direct current units. A 500-horsepower motor drives finishing scale breaker. No. 5 and No. 6 stands each have a 4500 horsepower, 125 to 250 revolution per minute motor operating through single gear reductions. Nos. 7, 8 and 9 use 5000-horsepower motors directly coupled to the pinion stands, the motors operating respectively at 80 to 160, 100 to 200, and 125 to 245 revolutions per minute. No. 10 finishing stand has a 2500 horsepower, 175 to 350 revolution per minute motor with a single reduction gear.

Finishing department includes five shearing lines, two side and end trimming shear lines, a slitting and recoiling line, two temper pass mills and a sheet pickler with two scrubbing lines and a re-squaring shear, which adequately handle the hot mill output.

Sheet piler at end of hot mill runout table



New Directory of Iron And Steel Plants Ready

■ *Directory of Iron and Steel Plants*, 1939; fabrikoid, 453 pages, 5 x 7½ inches; published by Steel Publications Inc., Pittsburgh; supplied by STEEL, Cleveland, for $10; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S. W. 1.

This annual publication lists companies and officials operating blast furnaces, steel plants, rolling mills, by-product coking plants, structural steel plants, boiler and tank shops in the United States and in Canada.

It is divided into three parts, the first containing blast furnaces and steel plants, the second by-product coking plants and allied industries and the third structural steel, iron, boiler, tank and allied industries. Each section presents names of companies alphabetically, with officers, equipment, products, capacity and railroad facilities. This is followed by a geographical index grouping companies under states and cities, with reference to page in the main section.

The current edition has been fully revised and latest information available is presented.

Makes Advances in Hollow Casting of Steel Rolls

■ Ohio Steel Foundry Co., Lima, O., reports some interesting developments in the manufacture of alloy steel "Holl-O-Cast" rolls. Briefly, large rolls are cast hollow by a method which permits removing the core easily. Only a few minutes are required for complete removal of the core.

Casting large steel rolls hollow is said to have four outstanding advantages. Ingotism and center line weakness is reduced. The rapid solidification of large rolls is promoted by a smaller cross section of metal and is aided by the chilling action of the core. This results in a fine grain structure as cast that is readily improved by heat treatment.

Internal hot rupture is positively eliminated.

Better heat treatment is said to be possible because heating and annealing stresses are diminished and a more drastic quenching of the roll bodies is permitted. Harder bodies, more refined structures and denser metal are said to improve quality of large rolls and to be especially important in backing-up rolls to improve their resistance to spalling.

Improved resistance of the hollow necks to fatigue brings about better economy due to longer life.

Simplified Practice for Grinding Wheels Revised

■ Revision of simplified practice R45, grinding wheels, has been approved by the standing committee in charge, and copies mailed by the division of simplified practice, national bureau of standards, to all interests for consideration and approval.

The schedule lists recommended sizes for each of the nine standard types of grinding wheels and is designed to simplify the stocking of wheels and to enable users to order stock items. Last previous revision was in 1932.

NEW METAL PRODUCTS

■ Draws of 7 and 12 inches, respectively, make the fabrication of this combination sink and laundry

tray a difficult operation at the plant of Briggs Mfg. Co., Detroit. The finished, enameled unit is formed from a single sheet of 14-gage Armco ingot iron. Eighteen dies, weighing over 100 tons, are involved in the press work. For the deep draw a press exerting 1500 tons pressure is required.

Combination unit weighs about 60 pounds and is supplied either in white or colored enamel. It was designed especially for installation in apartment houses, where space is at a premium. Variations include designs without the back panel and with flat rim for use with tile or linoleum.

■ Intended to bring the advantages of group washing to the small washroom, a new semicircular washfountain, 36 inches in diameter, has been announced by Bradley Washfountain Co., Milwaukee.

This fixture is available in enameled iron or stainless steel, hand or foot controlled. It has a capacity of three persons. Fountain is handsomely streamlined and is economical, space-saving and sanitary. It is especially suitable for installation in schools, institutions and shops. Model illustrated is de luxe type

EF washfountain in enameled pressed iron, foot controlled, with liquid soap dispenser.

■ Handling and storage of products on shelves and in bins is speeded up by an aluminum platform type warehouse ladder recently introduced by Aluminum Ladder Co., Tarentum, Pa. Casters on back legs facilitate movement.

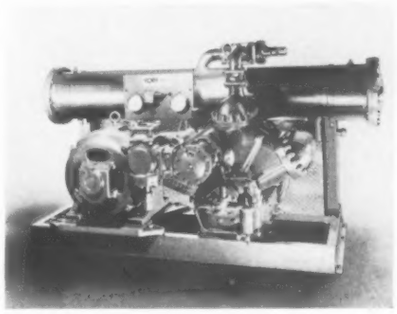
Ladder is made of 51 S. T. Alcoa aluminum, which has a tensile strength of 48,000 pounds per square inch. It weighs only 43 pounds and yet will support a load at 1000 pounds. Bottom of the ladder measures 28 x 22 inches, platform is 66 inches high and meas-

ures 22 x 22 inches. Ladder is ruggedly riveted. It will not rust, is easily cleaned and is non-sparking.

■ Made from 1000 feet of single strand monel wire woven and lock-stitched by a patented method, a new metallic cleaner introduced by Metal Textile Corp., Orange, N. J., offers many advantages for domestic and industrial use. The stainless metal will not rust, turn green or become discolored, nor will it fray or splinter. The cleaner is unusually durable and has been found useful in resisting chemical attack as well as wear and abrasion.

■ Capable of providing the cooling effect necessary to air condition an entire office building, hotel or department store, a W-type refrigeration compressor developed by York Ice Machinery Corp., York, Pa., is still so compact that it requires little more space than a large office desk.

A one-piece casting forms the crankcase of the compressor and houses the removable, nickel-iron cylinder sleeves which are assembled in three pairs. One pair is set vertically and the other two pairs at 60 degrees. This arrangement provides good balance, simplified lubrication, and permits use of a

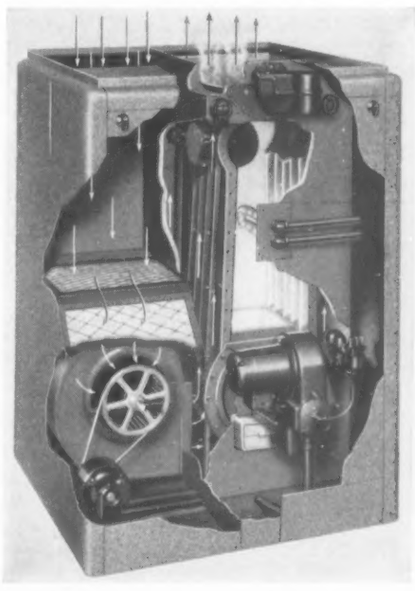


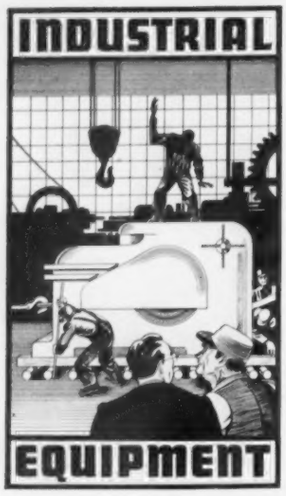
short, rigid, double-throw crankshaft requiring only two main bearings. Compressor is available in sizes from 40 to 175 horsepower. It can be used with water-cooled or evaporative condensers.

■ Made of cast iron with a baked enameled steel cabinet, a new oil-fired air conditioning unit is being marketed by Rudy Furnace Co., Dowagiac, Mich. This equipment is intended for the small home. It has a capacity of 85,000 B.t.u. per hour.

A controlled circulation system distributes heat evenly to all parts of a home, reducing air stratification and indoor drafts. The unit filters most dust, dirt and pollen from the air and supplies humidity to prevent air dryness, thus helping to preserve woodwork, furniture, plaster, etc.

Three air filters, an automatic humidifier and controls are standard equipment with a pressure type oil burner optional.





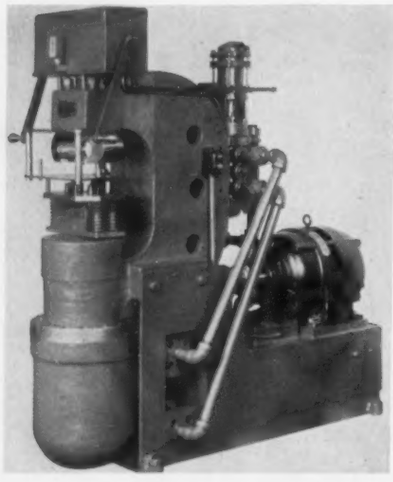
Wheel Dressing Tool Uses Special Diamonds

■ Super Tool Co., 356 East Congress street, Detroit, has placed on the market a wheel dressing tool, known as the Cardimond, which incorporates the use of black diamonds synthetically produced by forming a single crystal from a number of small stones.

These stones are said to be economical because of their comparatively low original cost and because of their irregular grain structure, which creates a stone the diamond cutter cannot cut and one that shows minimum wear per dressing. Sizes vary from 1½ karats upward, and shapes are similar to those of natural diamonds. There is only one quality.

Rivets Automotive Wheel Control Arm Assemblies

■ Hanna Engineering Works, 1765 Elston avenue, Chicago, has added to its line a 60-ton electric-hydraulic riveting press and fixture, designed for riveting of automotive right and lefthand front wheel control arm assemblies. This involves multiple riveting at the rate of 45 rivets per minute.

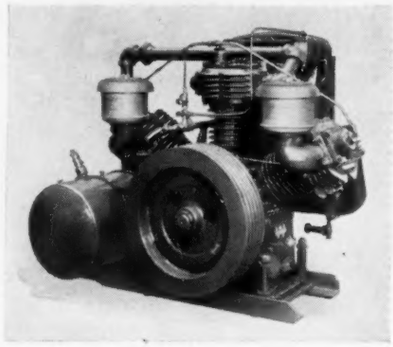


Initial work or closing movements are inaugurated by depressing a duplex control lever. Thereafter the entire cycle of clamping parts, riveting and return of ram to starting position is automatic. Control arrangement incorporates two safety features: Release of lever will instantly reverse pressure stroke; and a repeat cycle cannot take place.

Maximum pressures may be regulated to the work, thus holding power consumption to a minimum and avoiding work distortion. At maximum fluid pressure, this riveter exerts 60 tons on the dies, but it is available also in capacities of 20, 40 and 80 tons. Reach and gap may be varied to suit the work.

Portable Compressor Has Power Takeoff Drive

■ Worthington Pump and Machinery Corp., Harrison, N. J., has developed a portable air compressor

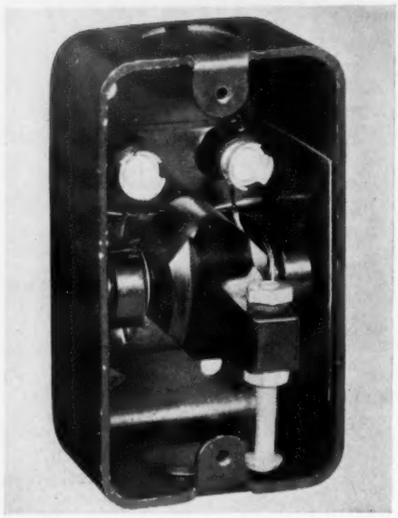


with power takeoff drive. Unit consists essentially of a compressor driven through a multi-V-drive by a Hercules drive unit installed between the truck transmission and the front universal joint of the propeller shaft. It is said to combine maximum portability with utilization of a minimum of truck payload space.

Compressor is a 3-cylinder, 2-stage, radial air-cooled type and includes an improved feather valve, ring type fins, large sectional type intercooler, articulated connecting rods, force-feed lubrication and by-pass unloading.

Mercury Button Contact Mechanism Closes Switch

■ General Electric Co., Schenectady, N. Y., has placed on the market a single pole limit switch which



uses a mercury button contact mechanism to open and close the circuit. Device is particularly suitable for use where force available for operation of the switch is small; only force required to operate this switch is that necessary to lift a lightweight molded arm.

Mercury button element consists of two corrosion resistant metal hemispherical shells separated by a special ceramic disk with an off-center hole. Assembly is partially filled with mercury. An atmosphere of hydrogen prevents burning and corrosion, and unit is hermetically sealed.

When the mercury button is rotated in the vertical plane, the off-center hole, normally below surface of the mercury, is raised out of the mercury, thus opening the circuit between the metal shells. Button is mounted in a molded assembly, which serves also as a lever arm, and is enclosed in a pressed steel enclosure with knockouts for conduit connections at both ends.

Clears Railway Switches

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced an electric Corox switch heater, designed to keep track switches clear

on steam, elevated or street railways.

Heater generates heat at point of use and distributes it along sections of the rail, providing operating temperatures sufficient to keep switches clear of ice and snow. Unit is so sealed as to prevent any moisture entering the heater. It is made of ⅝-inch tubing and is installed permanently under the head of the rail where it is protected from damage.

Mask Lenses Provide Full Vision for Wearer

■ Acme Protection Equipment Co., 3647 Liberty avenue, Pittsburgh, has announced a No. 5 full vision, snout type canister gas mask, which embodies a number of interesting features.

Full vision lenses enable wearer to see as well as when he is not

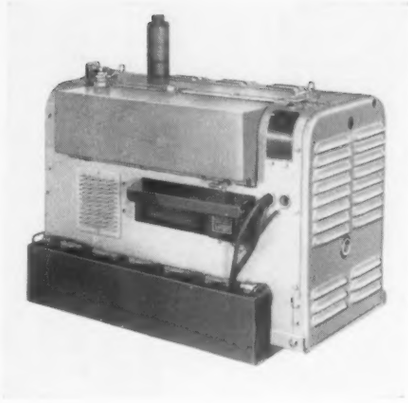
wearing the mask. The lightweight canister, directly connected to facepiece, permits wearer to move about with freedom.

Mask is recommended for use in low gas concentrations or for short periods in higher concentrations. It is available for protection against practically all poisonous gases, including organic vapors and acid gases, ammonia, hydrocyanic acid, chlorpicrin, etc.

Industrial Truck Power Plant Features Economy

■ Ready-Power Co., 3826 Grand River avenue, Detroit, has added to its line a heavy duty, 36, 48 or 60-volt power unit for use on 5 to 10-ton capacity production type electric trucks. Known as Model L, this unit is rated at 9.6 kilowatts.

The 6-cylinder engine has four main bearings, together with renewable connecting rod bearings, cast iron pistons, full length water



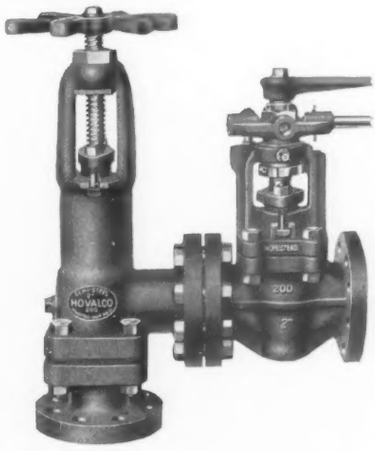
jackets, gear driven water pump, etc. Individual porting of manifolds results in even firing at all speeds, improved combustion and makes possible maximum fuel economy. Idling governor automatically maintains voltage at predetermined point. As load is applied this governor builds up engine speeds until rated voltage is developed, and when load is removed engine speed is reduced automatically.

Fuel consumption varies from 5 to 7 quarts of gasoline per operating hour, and oil consumption is at the rate of 2 gallons per fifty hours of service. Overall maintenance is said to average no more than 3 cents per hour of operation.

Combination Valves Are Designed for Low Upkeep

■ Homestead Valve Mfg. Co., Coraopolis, Pa., has announced a line of combination valves for modern boiler blowoff service, each unit consisting of an angle valve and a two-handle, lift type valve.

Seat and disk of angle valve are



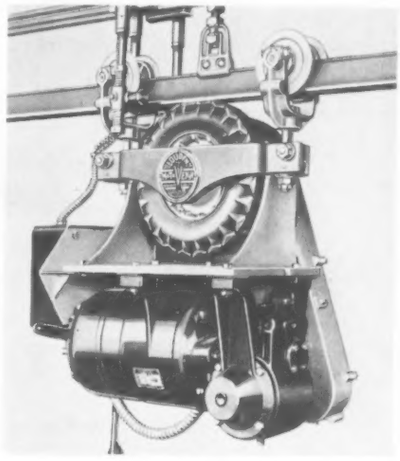
renewable, reversible and regrindable, and all seating members are stainless metal. There is said to be free passage of fluid, scale and sediment under any condition of service. Ample packing is provided; it is easily renewed under pressure.

The quarter-turn, lift type, plug valve has positive mechanical seating and unseating, eliminating leakage or sticking. All vital seating surfaces are fully protected in both open and closed positions against ravages of fluid velocity and temperature. Operating mechanism is mounted on exterior of the valve, away from action of fluid and heat.

This valve combination is made in 1½, 2 and 2½-inch sizes, for pressures up to 600 pounds per square inch. It may be had in all iron or steel for lower pressures and in cast steel for higher pressures.

Handling Unit Utilizes Rubber Tire for Drive

■ Louden Machinery Co., Fairfield, Iowa, has introduced a powered unit, called the Moto-Veyor, for



automatically transporting loads over an overhead track system. A rubber tire is utilized for the drive wheel, enabling the unit to maintain uniform speed on a down grade and to negotiate inclines.

Range of speed which can be provided varies from 60 to 600 feet per minute. Unit may be built into cab or step on platform, so operator can accompany loads. Drive shaft is supported in precision ball bearings on each side of the wheel. Main frame is cast in one piece, with motor mounted under the frame.

Unit is so balanced that there is no need of counterweights to make it hang plumb.

Truck Handles Cylinders

■ Lewis-Shepard Sales Corp., Watertown, Mass., has introduced a special truck for handling heavy cylinders of anhydrous ammonia, chlorine, etc. By means of a special frame and clamp device, operator may select tank from storage line

without disturbing other tanks. A simple push of a lever clamps tank safely to the truck frame, which then is pulled back to carrying position. Rocker on frame makes "breaking over" easy. Tank is in balance when being transported. Large wheels and roller bearings allow truck to pass over rough floors with unusual ease.

Rubber Mounting Makes Deflection Adjustable

■ B. F. Goodrich Co., Akron, O., has announced a new type of rubber machine mounting, the type 40 Vibro-Insulator, which provides "adjustable deflection." In other words, deflection can be regulated by use of either soft or stiff rubber in the mounting.

This adjustable feature is made possible by the mounting's construction which consists of rubber vulcanized to two parallel metal disks which are drilled and tapped for a 5/16-inch U.S.S. thread. Hole extends through entire length of mounting. Deflection is varied by length of the attaching screws. This mounting is offered in one size only. It is 1 inch in diameter, 1 inch long and carries a maximum load in shear of 10 pounds per mounting.

Oil-Burning Torch Has Non-Carbonizing Nozzle

■ Johnston Mfg. Co., 2825 East Hennepin avenue, Minneapolis, has placed on the market a small oil-burning hand torch, known as the Dri-Flame, for all operations where a small amount of heat is required, such as skin drying molds in foundries, preheating castings prior to welding, preheating steel sections for bending or straightening.

Torch requires no warm-up period. Its non-clogging design has no valve or restriction in the oil line, and the torch is guaranteed to operate continuously without variation in flame. Location of oil supply from tank to torch puts suction on the oil line at all times. Torch may be tipped at an angle with no danger of oil pouring out through the nozzle. Lightweight, heat resisting alloy nozzle is non-carbonizing.

Torch is available with 2-quart and 1-gallon capacity tanks. It requires from 3 to 5 cubic feet per minute of compressed air and may be operated from an average compressor.

Toggle Clamping Tools Hold Production Parts

■ Knu-Vise Products Co., 6432 Cass avenue, Detroit, has introduced rapid-action toggle pliers and a spring stop gage to its line of clamping tools and appliances. The pliers are a manually operated clamping tool, intended for easy moving about and, like toggle clamps, are designed for holding pieces in position for welding, reaming, drilling or assembly. Positive and quick-acting, they lock in position automatically and release quickly, being fitted with an adjustable jaw to accommodate different thicknesses of material. They are made of a hardened high-grade alloy steel.

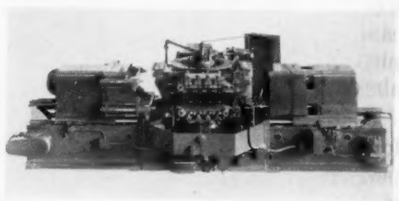
The spring stop gage is intended to be placed on fixtures, jigs or dies where parts must be held or located in position temporarily, being particularly convenient when there is some variation in the width or thickness of pieces handled.

Improvements have been made in the company's line of toggle-action clamps, furnished in three sizes with either flat hinged base or square base. Ratio of clamping pressure to hand lever operating pressure is 22 to 1.

Knu-Vise also has introduced to the trade a quick-action machine vise, provided with two jaws which operate in a horizontal plane, opened and closed through a toggle mechanism actuated by the lever at the back. Maximum movement of jaws is ¾-inch. On the machined front face of the body is provided an angle plate, adjustable vertically, also tiltable. It serves as a stop or support for the work during machining and also may be used as a chute for directing finished pieces as they fall from the jaws. Several types of these vises are available, including one operated by a handwheel.

Driller and Tapper Has Automatic Turret Index

■ Baker Bros. Inc., Toledo, O., has placed on the market an improved three-way unit type way driller and tapper, known as No. 3½-16, so designed that all units are flexible for change over and all vital operating mechanisms are accessible.



Machine is intended for drilling and tapping drop-forged steering knuckle support arms. On the center of its heavily ribbed bed is mounted an upright casting carrying upper and lower ball bearings for mounting of the 4-station turret. This turret has an automatic index arrangement. Three units are mounted to the center bed, each carrying an 8-spindle fixed center head. These are automatic in cycle with electrically interlocked control. For drilling and chamfering, units have hydraulic feeds, with oil pressure at a maximum of 1000 pounds per square inch.

Multiple heads required are

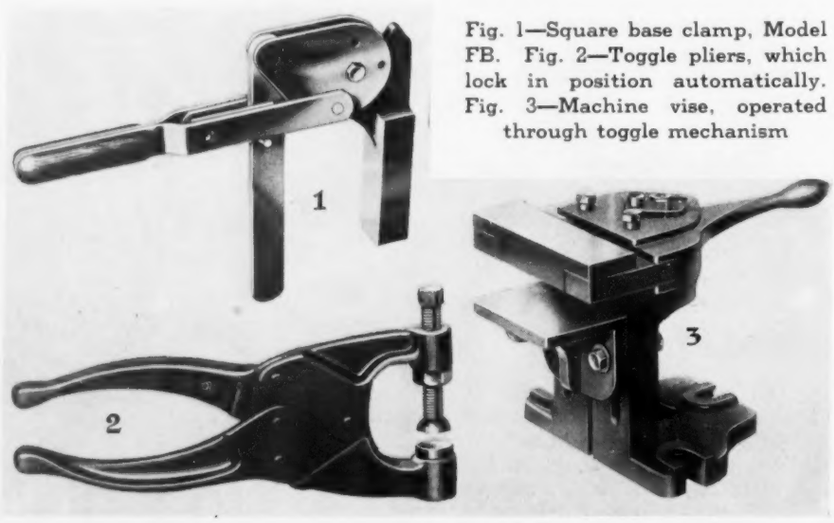


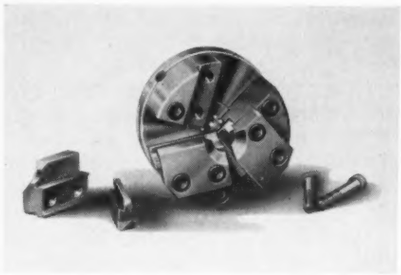
Fig. 1—Square base clamp, Model FB. Fig. 2—Toggle pliers, which lock in position automatically. Fig. 3—Machine vise, operated through toggle mechanism

mounted to head brackets and are driven from motors mounted in the brackets. Each head has provision for pickoff gears for changing speed of spindles. Four holding fixtures are furnished, mounted to the four turret positions. Each fixture is arranged for chucking four parts, which are hydraulically clamped in position.

Special Forming Head Has Two New Functions

■ Landis Machine Co., Waynesboro, Pa., recently designed a special forming head for use on its automatic forming and threading machine.

In addition to facing and beveling



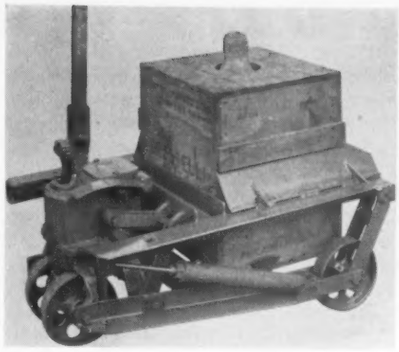
the end of the work, cutters used in this head are designed to reduce body diameter of work and to face the shoulder at end of the cut. In order to reduce strain on the head, cutting load is distributed over three cutters. Cutters are located and securely lodged in correct cutting position by a setting gage and a clamping action similar to that employed for the Landis tangential chaser. Provision is made for independent adjustment of each cutter holder.

Forming head body and cutting tool holders are alloy steel, heat-treated to insure maximum wearing qualities.

Specially Designed Lift Truck Handles Carboys

■ Yale & Towne Mfg. Co., Philadelphia division, Philadelphia, has designed a special lift truck for picking up and transporting carboys.

Lifting frame conveniently straddles the carboy, while the wing attachments on top of this frame permit adjustment to compensate for small variations in carboy widths. Truck has a 6-inch mechanical lift secured through a downward movement of the handle. Load may be raised from either side or from the front. An automotive type release check is installed in each lower side frame, and the two checks working together lower the load smoothly and without jar. Semisteel



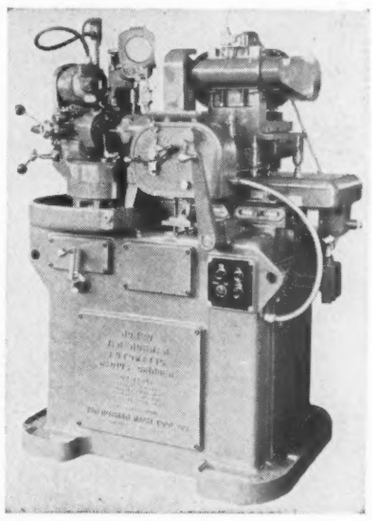
wheels, equipped with Hyatt roller bearings, operate on alloy steel axles to give an effortless roll.

Internal Radius Grinder Is Entirely Automatic

■ Van Norman Machine Tool Co., Springfield, Mass., recently brought out its Model 120 radius grinder, designed particularly for the spherical grinding of the smallest ball-bearing outer rings up to 1⅞-inch diameter.

In operation, race is loaded in holding fixture and machine is started by a finger-touch lever which automatically moves wheel into grinding position. Workhead automatically starts rotating and oscillating, and wheel automatically feeds into work. When race is ground to size, wheel removes to unloading position and workhead stops. Machine has an electric control on the feed drum so that when wheel is fed to the point of proper size, slide will automatically remove to unloading position.

Motorized workhead delivers 2000 revolutions per minute to the workhead spindle. Wheel spindle operates up to 40,000 revolutions per minute and is driven by a 3-horsepower motor. Drive unit is mounted directly on the wheel slide. Speed

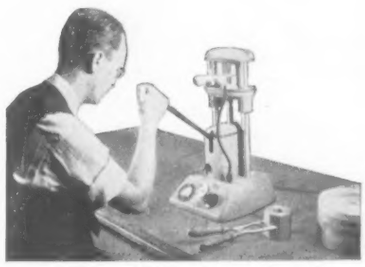


changes to wheel spindle are by pulley changes on the spindle drive unit.

Mounts Metallographic Specimens in Plastic

■ Fisher Scientific Co., 711 Forbes street, Pittsburgh, has developed an improved press for the mounting of metallographic specimens by the polymerization of Lucite (methyl methacrylate) or other thermoplastic through the application of heat and pressure, forming a glass-like solid which allows complete inspection of the specimen and yet protects it against deterioration.

By mounting such specimens as



fine wires, thin sheets, plated or painted surfaces, cuttings, etc., the process of polishing is facilitated, as operator is able to hold sample against a grinding belt or polishing head without difficulty.

Press is operated by a hydraulic system which exerts up to 5000 pounds pressure against a hardened piston within a steel cylinder that holds the sample and thermoplastic. Mounts 1 inch in diameter and up to 1¼ inches in height are produced. Heat is applied to the cylinder and sample by divided aluminum blocks which fit around the cylinder and can be attached or removed by operating two handles in a scissor-like motion. Rapid cooling of the mount is accomplished by similar aluminum blocks which dissipate the heat quickly.

Temperature of the two heaters is controlled by a rheostat.

Welding Cable Is Tough

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced a welding cable, called Flexarc, for field and shop use. This cable is light in weight and has positive insulation. Paper separator between copper and rubber sheathing permits sliding action between outside layer of wires and the rubber jacket. The large number of fine copper wires composing the stranding is said to provide extreme flexibility. Protective jackets are of 60 per cent rubber armor, built for severe service.

Manual of Navigation On the Great Lakes

■ *Mariners' Manual of Great Lakes*, by Charles Richter; cloth, 192 pages, 5¾ x 9 inches; published by Penton Publishing Co., Cleveland; supplied by STEEL, Cleveland, for $5; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

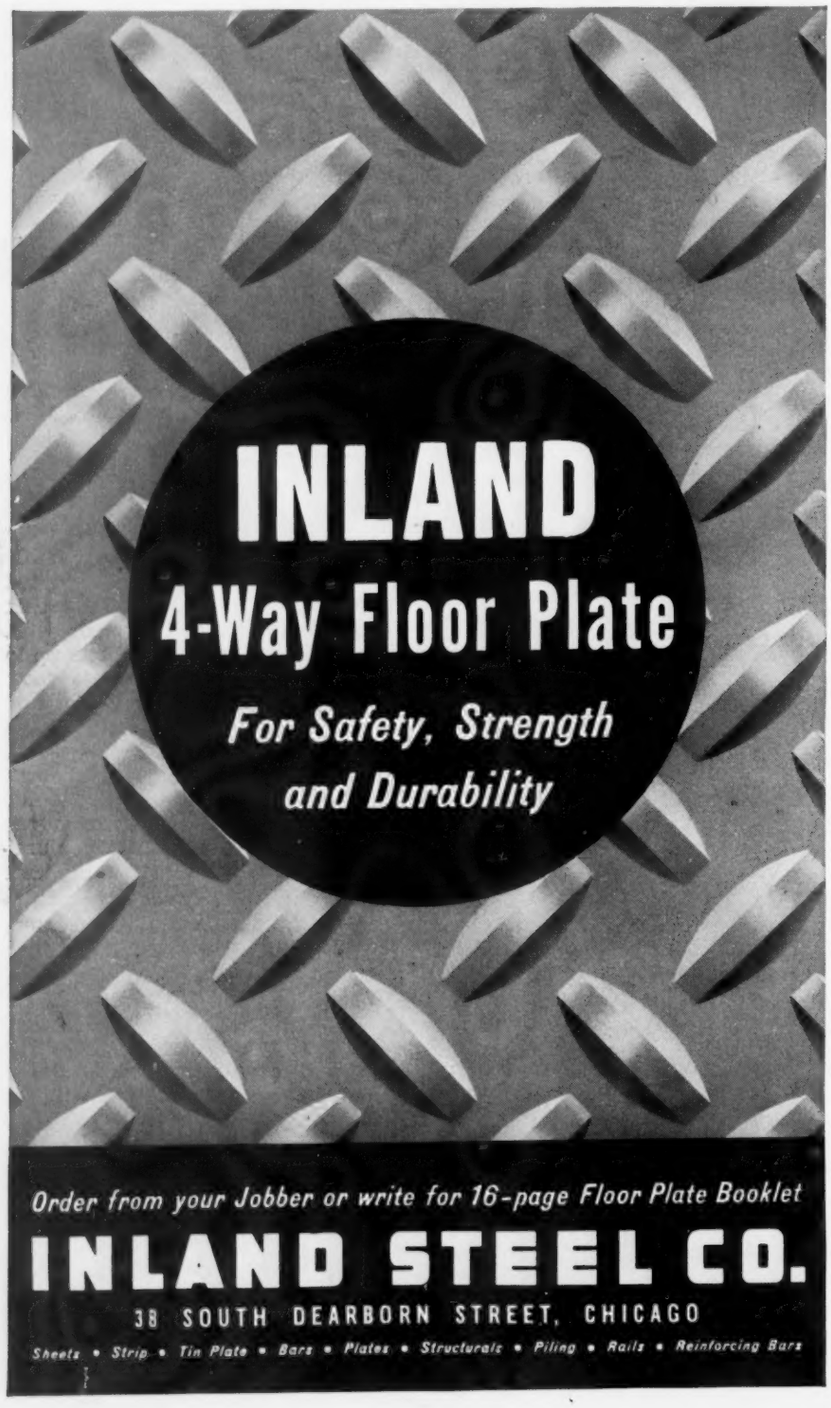
The author is a master mariner and a former lieutenant in the United States navy. From experience of many years in navigating the lakes he has gained knowledge of the peculiar problems facing mariners whose routes lay along these inland waterways.

The four sections of the book deal with what an officer should know, the rivers, the compass and 500 answers to nautical questions. Officers' knowledge should cover bearings and how to take them accurately, six comprehensive tables supplying data; symbols and signals are described, bridge signals for all Great Lakes bridges; data on loading, stresses and strains.

Full information is given for navigating the St. Marys and St. Clair rivers, St. Clair canal and Detroit river, with completely detailed courses for each. Twelve color charts of the rivers are included.

The government buoy system on the lakes is described, and vessel lights explained. Complete treatment is given the compass as used on the lakes and differences from the method used on ocean-going vessels pointed out. The question and answer section supplies quickly the answer to problems which come up frequently and through alphabetical arrangement and index are readily accessible.

The style is concise and direct, to supply information with the least effort on the part of the reader.


INLAND
4-Way Floor Plate
For Safety, Strength and Durability
Order from your Jobber or write for 16-page Floor Plate Booklet
INLAND STEEL CO.
38 SOUTH DEARBORN STREET, CHICAGO
Sheets • Strip • Tin Plate • Bars • Plates • Structurals • Piling • Rails • Reinforcing Bars

A.S.T.M. Publishes Books On Physical Testing

■ The symposium on impact testing, held by the American Society for Testing Materials at its 1938 meeting, and the Edgar Marburg lecture on the torsion test, presented at the same meeting, have been published by the society, the former in standard publication form and the latter in special pamphlet form.

The symposium concentrated on two of the most important phases of impact testing, first, present fields of commercial use for the test with particular reference to places where it gives necessary information not supplied by static tests, and second, basic theory of the test. Nine extensive technical papers and discussions comprise the 170-page book.

Utility and nonstandard impact testing, problems in the field of plastics, practical application of the notched-bar impact test, use of the Charpy test as method of evaluating toughness adjacent to welds are covered in separate papers, followed by data on stress-strain relations under tension impact loading and a discussion of the theory of impact testing, involving the influence of temperature, velocity of deformation and form and size of specimen on work of deformation. Some general considerations on impact testing problems are presented, then a review of the literature on testing of welded joints, and finally a resume of notched bar testing and impact testing.

The Marburg lecture by Dr. Sauveur gives general information on the torsion test, describes the machine and test specimens, and presents results of tests on various metals. This is followed by information and data on tests at elevated temperatures, twisting in the blue heat range, reverse twisting and torsion of single crystals.

Copies of these two publications can be supplied by STEEL, Cleveland, at $1.25 each for the "Symposium on Impact Testing," and 35 cents each for "The Torsion Test."

Automatic Carbon Arc

(*Continued from Page* 53)

is 5/32-inch. When welded, tubes are upset. No excess metal is required to provide for swaging. A tremendous saving in cost of material is effected, the exact amount dependent upon the analysis of the steel and the type of tube. Where required, tubular parts are upset at the end after welding. These tubes have been upset from 3/32 to ⅜-inch, equivalent to thickening the walls four times, without splitting the weld.

Mufflers are arc welded by this process at a rate of 250 completed units per hour using seven welders and two operations. Heads are first welded to inlet and outlet tubes by four electronic tornado units at the rate of a completed muffler every 8½ seconds. Heads are 18-gage and 6¼ inches in diameter. The second step is to weld three louvered tubes to the inner shell. Tubes are 18-gage material, 1½ inches diameter and 18 inches long—a total of 19½ inches of welding.

Progressive Dies Used

Step-by-step fabrication of a rear axle housing for one of America's most popular cars will show the part that this equipment plays in an actual fabrication process.

Forming operations are performed, Fig. 2, in a hydraulic press using a 5-station die. Here the flat blank is formed in five operations into the trough-shape lying in the die part at right. Each piece is shown as it is formed in the station which it occupies. As there are always five pieces in the press, a piece is turned out every 15 seconds.

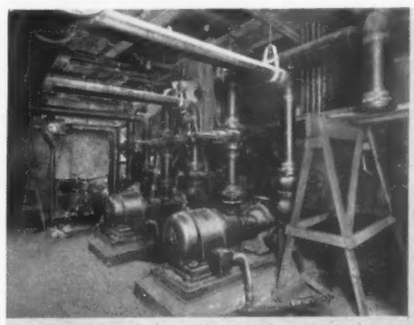
Final forming and restrike operations are performed in a hydraulic press, Fig. 3, using a 2-station die. In the first station of this die, the half-banjo is formed. In the restrike operation, edges of the half-tube are coined out or upset 0.015-inch to furnish additional thickness for the weld. One piece is turned out with each press stroke every 24 seconds. Next operation, although not shown, is washing or cleaning prior to welding.

The two halves are clamped and flashed together at the banjo preparatory to welding the long seams automatically with the electronic tornado. Tacking the two halves of the banjo housing together takes 41 seconds.

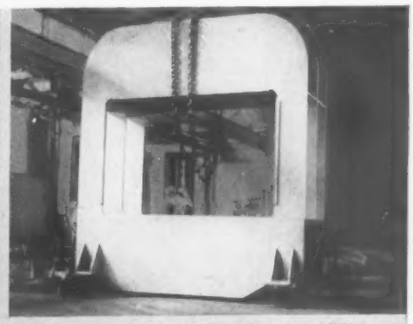
Fig. 5 shows the banjo housing and jig of the electric tornado ready to make automatic seam welds. The two electronic tornado boots are seen at the top of the picture with the carbons projecting from the lower end. In the welding operation, the two carbons automatically strike arcs at the center of the housing. After a short interval to allow the arcs to melt metal, the heads move out from the center, playing the arcs on the seam and puddling the edges together. Upon arriving at end of seam, arcs are extinguished automatically and the heads returned to the center.

This operation is performed on each side of the housing, total time for both sides being 43 seconds. One man does 53 per hour on two machines, at an operating factor of about 63½ per cent. Welding the hats or covers on the differential housing of the rear axle, the final step.

Several other applications of this process now being handled on a production or experimental basis are worthy of mention: Welding propeller shafts, both the tubing and the lapweld; fabricating exhaust tubing at high speed using an oscillating electronic tornado and employing hot-rolled rather than cold-rolled stock; welding Diesel engine cylinder walls; production of front axles from tubular sections and stampings for a special light-weight though rigid construction; making A frames of pressed steel and welded construction for independent front wheel suspension; also edge and butt welding of compressor housing assemblies for air-condition-



1 Ease of handling in tight places, and in vertical and overhead positions saves time when installing welded piping and fittings. *Photo courtesy Consolidated Edison Co., New York City.*



2 Welds in heavy equipment, such as this press frame made of 70,000 lb. tensile strength steel, are speedily made with Murex Carbon-Moly .50 to withstand shock and vibration. *Photo courtesy Dayton Fabricated Steel Co., Dayton, O.*

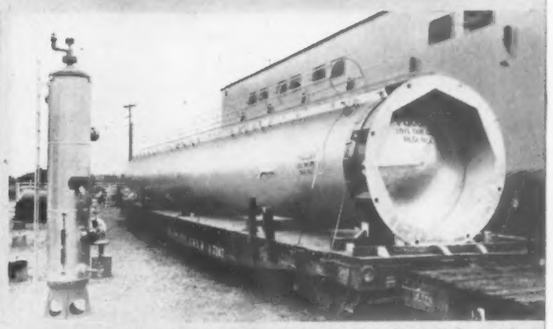
WELDING COSTS CAN BE CUT— HERE'S HOW OTHERS DO IT

Murex Electrodes have provided the answer to many a fabricator's problem of how to lower welding costs and still do superior welding.

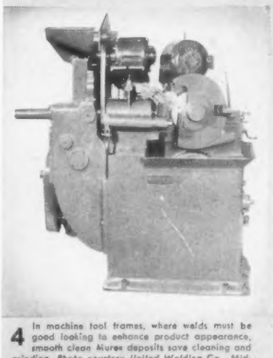
To give you more efficient welding, our laboratory is continually at work on research and development of electrodes. The Murex line is constantly being improved and added to. In the past year, for example, four new electrodes have been introduced and have won immediate acceptance. These include straight and reverse polarity all-position rods, a new high speed downhand electrode, and one designed for all positions on carbon-molybdenum steel.

Ask to have our nearest representative show you what Murex can do. No obligation, of course.

Also, send for your copy of the handy pocket-size Murex pamphlet giving concise data on the properties and applications of the various Murex Electrodes.



3 In pressure vessel work, X-ray clean deposits, assured by Murex, prevent costly chipping out and rewelding of faulty seams. *Photo courtesy Vulcan Steel Tank Co., Tulsa, Okla.*



4 In machine tool frames, where welds must be good looking to enhance product appearance, smooth clean Murex deposits save cleaning and grinding. *Photo courtesy United Welding Co., Middletown, O.*

5 Welders prefer Murex. Spatter-free deposits save cleaning time. Higher heats speed work, particularly with Fillet and other new Murex rods. *Photo courtesy Ryan Car Co., Chicago, Ill.*

MUREX
HEAVY COATED
ELECTRODES

METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
Albany • Chicago • Pittsburgh • So. San Francisco • Toronto

ing of cars, and constant oil level reservoirs for busses, trucks, etc.

The electronic tornado process has several advantages in such work. Power consumption is low because power is furnished by a motor-generator set with small installed horsepower. Supplies are inexpensive as all that is involved is carbon and flux. Operation is completely automatic. Operator only needs to push the starting and stopping button as the arc makes and breaks automatically and the fixture is automatic as well. Duplication of satisfactory welding conditions is accomplished easily. High speed of production makes it possible for the manufacturer to have an ample supply of parts always on hand.

Welding in automobile manufacture has increased more than 100 per cent every year since 1934. Its importance today is indicated by the fact that engineers estimate the cost of producing a popular low-priced car without welding would total $3,000.00.

Truck and Bus Frames

(*Concluded from Page* 49)

is completed, the rails are passed into the south end of the west bay where they are checked for alignment and given a final inspection.

At this point, side rails take one of two routes. Frames for heavy trucks and buses usually are shipped knocked down, and therefore the rails are moved by crane to the extreme opposite or north end of the West bay where they are painted and loaded by crane into open cars, the painting and shipping department being immediately adjacent. Side rails for lighter vehicles are shifted by crane to the new section devoted to the assembly of light truck frames, located just north of the inspection department.

Steps in Frame Assembly

Four principal operations are performed in the truck frame assembly department. On the first table, brackets are riveted to side rails, the rails being handled in pairs. The rails then are shifted to the second table where cross members are loosely fitted to the rails with rivets. The frame then is moved to a fixture where the cross members are riveted to the rails, being held rigidly in place by air-actuated clamps. Completed frame is moved to a bench where it is checked for alignment. It will be noted in Fig. 4 that handling of frames in the assembly line is accomplished by a simple overhead hoist arrangement developed here. Assembled frames are shifted by crane in lots of five or six to the painting department and subsequently to the shipping platform.

As previously pointed out, the Parish company finds it more economical to pickle low carbon plates and sheets with its own equipment. Steel for cross members and brackets therefore is switched into the previously mentioned west wing. Roughly speaking, this wing is divided into two sections with the pickling tanks in the south half and the north half reserved for storage space. These two sections are divided by a wide runway for gasoline trucks. This runway extends practically the full length of the entire plant and provides one of the principal thoroughfares for interdepartment movement of material. The railroad switch, of course, is located at the extreme west side of the wing and runs north and south. Tops of the open cars are at floor level.

This wing is equipped with one 10-ton overhead crane. Often the sheets or light plates, in units of 8 to 10 tons, are unloaded directly into the pickling tanks and subsequently loaded on waiting skids which are picked up by lift trucks and quickly transported to the stamping presses in the second bay. The storage section of the wing acts as a stabilizer which serves to level out irregularities in incoming steel shipments and consumption. It usually contains quantities of both pickled and unpickled steel.

Handling of cross members and brackets is comparatively simple. Stampings drop automatically into tote boxes and are trucked either to the assembly division for light frames or, in the case of heavy truck parts, directly to the painting department and on to the shipping platform.

Handling of truck steel and material for miscellaneous work is efficiently intermeshed so no interference or delays result. Miscellaneous items consist principally of small stampings. Trucks usually handle such material with complete satisfaction.

•

Thin Chemical Coating Neutralizes Reflections

■ By applying thin chemical films to the surface of a glass by a new process, Dr. Katharine B. Blodgett, General Electric Co., Schenectady, N. Y., has been able to nullify or neutralize rebounding or reflected light rays, with the result that pictures framed with glass so treated appear as though there were no glass, regardless of the angle from which they are viewed. Similar results, it is said, may be obtained with clock faces, show cases, meter lenses, cameras, telescopes, etc.

After the refractive index of any particular type of glass is known, the process consists of building or attaching to the glass a transparent film of insoluble soap about four millionths of an inch thick, or exactly one-quarter wave length of light. As light falls upon this film, rays are reflected from both upper and lower surfaces. Rays coming from the outer and upper surface are equal in intensity and opposite in phase to rays reflected from lower surface. Rays thus counteract one another, and no light is reflected.

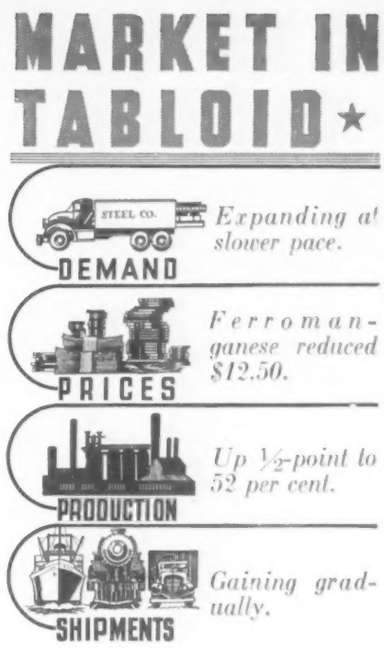
"HERCULES"
RED-STRAND
REG. U.S. PAT. OFF.
WIRE ROPE
Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.
A GIANT in Strength and Endurance

MADE ONLY BY
A. Leschen & Sons Rope Co.
ESTABLISHED 1857
5909 KENNERLY AVENUE
ST. LOUIS, MO.
NEW YORK
CHICAGO
DENVER
SAN FRANCISCO
PORTLAND
SEATTLE

ADVERTISING PARTS REMOVED

Additional Rise In Steel Demand Small

Expansion In Output Retarded; Outlook Still Favorable



■ IMPROVEMENT in steel inquiries is slow to be translated into orders, and the initial post-holiday rebound in production has been arrested. Operations advanced only ½-point to 52 per cent last week.

Specifications are slightly heavier in most directions but buying hesitancy common to early days of a new year still is apparent. The latter situation is most apparent in bars and flat-rolled products.

Nevertheless, various factors point to sustained or rising business during coming weeks. Substantial tonnages of building steel are on books and in prospect. Railroads are becoming moderately more active in rail and equipment markets. Automotive operations are well maintained for this period. Tin plate demand is commencing to expand.

Additional steel orders for public works are bolstering structural shape and reinforcing bar awards. Recent shape bookings are headed by 5020 tons for a machine shop at the Mare Island, Calif., navy yard, while 5300 tons of bars has been placed for three California projects.

Railroad legislation by congress still is awaited, but in the meantime several roads are proceeding with maintenance and improvement programs. Rail orders include 12,500 tons for the St. Louis-San Francisco and 9000 tons for the New York, New Haven & Hartford. Union Pacific is in the market for 100,000 tons of rails and accessories and 15 locomotives, while the Southern Pacific is inquiring for 40 locomotives and is expected to buy 25,000 tons of rails.

Pennsylvania railroad has ordered 15 dining cars and 12 coaches. Lehigh & New England is inquiring for 100 hopper cars.

Auto Production Rebounds; 32 Per Cent Ahead Of 1938

Automobile production spurted last week, a gain of 10,000 units reflecting removal of holiday influences the preceding two weeks. The 86,925 cars and trucks assembled was 32 per cent larger than output a year ago. Ford contributed a large part of the gain, increasing from 17,740 units to 21,750. General Motors expanded from 32,230 to 35,540; Chrysler dropped from 21,610 to 20,860; other makers stepped up from 5105 to 8775.

Tin plate output, while slightly higher at 40 to 45 per cent, still is relatively light. Specifications are expanding and inquiries are heavier in anticipation of the packing season, but a better idea of tin plate requirements of food packers will be determined after the coming canners' convention. Tin plate inventories of can makers are low, but stocks of some canned foods are excessive.

Steel demand from farm equipment builders is slightly heavier, although only a moderate increase is seen for this quarter in view of the trend in agricultural income.

Prices Holding On Majority Of Finished Steel Products

Prices of the majority of steel products are firm but in some instances have yet to be tested by large orders. Ferromanganese has been reduced $12.50 a ton. This cut follows reaffirmation of the former $92.50 price about a month ago and is attributed to concessions on offerings from abroad.

Divergent trends were shown in steelmaking in various districts last week. Pittsburgh operations were unchanged at 44 per cent, but Chicago was off 4 points at 49 per cent. Cleveland advanced 2.5 points to 56.5 per cent, Youngstown was up 5 points at 55 per cent and New England increased 5 points to 75 per cent.

These gains largely were offset by reductions of 7 points to 65 per cent at Cincinnati, 5.5 points to 40 per cent at St. Louis and 4 points to 87 per cent at Detroit. Other districts were unchanged, including eastern Pennsylvania at 34 per cent, Wheeling at 64, Buffalo at 44 and Birmingham at 77.

Scrap continues to mark time, with prices generally steady and drawing support in some district from export business. The scrap composite is unchanged at $14.79, while the finished steel composite holds at $56.50.

COMPOSITE MARKET AVERAGES

	Jan. 14	Jan. 7	Dec. 31	One Month Ago Dec., 1938	Three Months Ago Oct., 1938	One Year Ago Jan., 1938	Five Years Ago Jan., 1934
Iron and Steel	$36.37	$36.36	$36.36	$36.36	$36.48	$38.95	$31.15
Finished Steel	56.50	56.50	56.50	56.50	57.04	61.70	51.10
Steelworks Scrap..	14.79	14.79	14.79	14.77	14.00	13.85	11.24

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 14, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.10	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.15	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.10	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.15	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Jan. 14, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.50	$14.95	$14.05
Heavy melt. steel, No. 2, E. Pa.	13.25	13.20	12.95	13.75
Heavy melting steel, Chicago	13.75	13.85	13.05	13.25
Rails for rolling, Chicago	17.75	17.75	16.25	14.90
Railroad steel specialties, Chicago	16.00	16.05	15.55	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 1.50-4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅞-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¾ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2½" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 47/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.24
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$60.80
First Quality	
Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50
Second Quality	
Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00
Ohio	
First quality	39.90
Intermediate	36.10
Second quality	31.35
Malleable Bung Brick	
All bases	$56.05
Silica Brick	
Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50
Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press	$28.00
Wire cut	$26.00

Magnesite	
Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $23.50-24.00

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge $22.00

No. 2 lump 22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 86.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.35
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	7.90	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.30	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Jan. 12

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports	£ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling	£ s d
Foundry, 2.50-3.00 Si.	$23.35	5 0 0	$17.47		2 1 0
Basic bessemer	.....	.....	15.98		1 17 6
Hematite, Phos. .03-.05	26.85	5 15 0*	.....		.....
Billets	$34.44	7 7 6	$42.60		5 0 0
Wire rods, No. 5 gage	52.65	11 5 6	43.66		5 2 6
Standard rails	$44.37	9 10 0	$48.99		5 15 0
Merchant bars	2.30c	11 0 0	1.95c to 2.05c	5 0 0 to 5 5 0	
Structural shapes	2.09c	10 0 0	1.90c		4 17 6
Plates, †¼ in. or 5 mm.	2.27c	10 17 6	2.19c to 2.39c	5 12 6 to 6 2 6	
Sheets, black, 24 gage or 0.5 mm.	2.72c	13 0 0	2.93c		7 10 0°
Sheets, gal., 24 ga., corr.	3.29c	15 15 0	3.51c		9 0 0
Bands and strips	2.77c	13 5 0	2.15c		5 10 0
Plain wire, base	4.08c	19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0	
Galvanized wire, base	4.86c	23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6	
Wire nails, base	3.87c	18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0	
Tin plate, box 108 lbs.	$ 4.73	1 0 3	.....	.....	

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.12	4 19 0(a)	$15.79	598	$16.90	500	$25.26	63
Basic bess. pig iron	21.60	4 12 6(a)	.....	.....	.....	.....	27.87	(b)59.50
Furnace coke	6.42	1 7 6	5.94	225	7.27	215	7.62	19
Billets	34.44	7 7 6	24.47	927	29.07	860	38.70	96.50
Standard rails	1.99c	9 10 0	1.39c	1,155	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.42c	1,180	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.38c	1,152	1.65c	1,100	1.95c	107
Plates, †¼-in. or 5 mm.	2.20c	10 10 6††	1.78c	1,487	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.10c	1,748‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	2.70c	2,250	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.58c	1,316	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.50-13.75
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	11.75-12.25
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.50-10.00
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.50-13.00
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	12.00-12.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R.R.)	16.00-16.50
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	14.00
Toronto, dirs. No. 1	10.00-11.00
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	11.75-12.25
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.00-13.50
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	10.00-10.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	11.75-12.25
Chicago No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 4.75
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.00- 4.00
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	7.50- 8.50
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.75
Cincinnati, dealers	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.75- 8.25
Chicago	5.50- 6.00
Cincinnati, dealers	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.75-16.25

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.00-17.50
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.75-17.25
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	17.75-18.25
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.25-16.75
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.25-14.75

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers	7.25-7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.50-13.00
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	11.75-12.25
Cleveland	11.50-12.00
Detroit	9.75-10.25
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.75-19.25

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	19.00-19.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.00-17.50
St. Louis, iron	14.00-14.50
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.50-13.00
St. Louis, agri. mach.	14.50-15.00
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	9.00- 9.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-15.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets, Strip

Sheet and Strip Prices, Pages 70, 71

Pittsburgh—Sheet business consists principally of orders from small consumers and fill-in needs of automotive interests. Domestic appliance makers are better buyers though demand still is low. Jobber orders are increasing slowly. Sheet production has rebounded to early November levels, and January output may top December. Output of various grades of sheets and strip ranges from 45 to 55 per cent.

Cleveland—A level trend has replaced the moderate bulge in specifications noted a week ago, but an upturn in new business is indicated for January as a whole. Demand from miscellaneous users has more than offset the seasonal lag in automotive activity. Heavier buying by motor car interests is not expected until late January.

Chicago—Despite slow buying by large consumers, a fair volume of orders is appearing from small miscellaneous users. Steady demand from makers of steel furniture and household equipment is expected to be maintained, with leading buyers counted on for heavier ordering in the near future. Earlier deliveries on sheets and strip now are available, although shipments of material ordered at reduced prices last fall have yet to be completed.

New York—Demand for narrow cold strip has rebounded to about 70 per cent of the pre-holiday rate. Orders from farm equipment builders are encouraging, while some new automotive business also has been placed. Most tonnage is for immediate shipment. Low-price tonnage booked last fall largely has been shipped. Prices are steady.

Philadelphia—Sheet deliveries to the automotive trade are lighter, due to holdups on parts specifications. Makers of small stampings still are fairly busy on orders from manufacturers of refrigerators, stoves and radios. E. G. Budd Mfg. Co. is expected in the market shortly for stainless steel for five diners and 12 coaches booked for the Pennsylvania railroad.

Buffalo—Flat-rolled steel production was retarded last week by a shutdown at one plant for repairs. Demand is steady, although automotive releases have tapered.

Cincinnati—Sheet buying has recovered from the reduced holiday level, with heavier booking expected later this month. Business includes some fair-size automotive orders and broad demand from miscellaneous consumers. Prices are firm.

Birmingham, Ala.—Mills here and at Gadsden continue on a 100 per cent production basis as far as sheets are concerned, although there is no delay in shipments. Some little accumulation of business is reported.

Plates

Plate Prices, Page 70

Cleveland — New business, while still light, is moderately heavier than a month ago. Inquiries for boilers, tanks and repairs to industrial equipment are slightly more active. A substantial tonnage for waterworks improvements, Toledo, O., has yet to appear for bids.

Philadelphia — Locomotive builders are figuring on 40 locomotives for the Southern Pacific and 15 for the Union Pacific, requiring an estimated 5000 tons of plates. Reading railroad is inquiring for 500 tons for a car repair program. Columbia Foundation Co. here has received the contract for laying 1000 tons of 42-inch pipe, taking 7/16-

PRECISION to less than .001 inch

● Horsburgh & Scott Worms are ground within an accuracy of .001" in lead, indexing and contour . . . a precision in manufacturing that insures higher efficiency, longer life and quieter operation. To obtain these exceedingly close limits, this company developed its own exclusive grinding machines. These machines plus precision inspection fixtures are your guarantee of the finest worms and gears possible.

A 448 page catalog is yours without obligation.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

inch plates, for Harrisburg, Pa., subject to federal approval. Ship releases are negligible, while miscellaneous demand also is slow.

New York—Plate buying is increasing slowly. Demand is mostly miscellaneous and involves stock replacements as well as scattered tonnages for construction work. Boiler manufacturers are specifying slowly. Oil company tonnage is being released more freely, principally for maintenance work. Railroad buying is quiet.

Birmingham, Ala. — Replenishment by jobbers and consumers has reflected somewhat in demand for plates, with current specifications for railroad business. In addition miscellaneous demand continues for small lots.

San Francisco—Boiler Tank & Pipe Co. booked slightly less than 100 tons for a 1,000,000-gallon tank for the east bay municipal utility district, Oakland, Calif. Bids open Jan. 19 for 1890 feet of 4-foot discharge pipe for the United States Indian Irrigation Service at Polson, Mont., for Flathead river pumping plant and Jan. 24 for discharge pipe for Contra Costa canal, Central valley project, Oakley, Calif.

Seattle—Beall Pipe & Tank Co., Portland, has the subcontract for fabricating 42,000 feet of 16 and 20-inch steel pipe, 900 tons, for a water system improvement at Corvallis, Oreg. Award is pending for 1200 tons for a Puget Sound navy yard caisson.

Plate Contracts Placed

2500 tons, 22 to 37-inch welded steel pipe, metropolitan water district, Los Angeles, specification 293, to Western Pipe & Steel Co., Los Angeles.

1000 tons, pipe line, Colorado Springs, Colo., to Taylor Forge & Pipe Works, Chicago.

900 tons, 16 and 20-inch water pipe for Corvallis, Oreg., to Beall Pipe & Tank Co., Portland; Empire Construction Co., Portland, general contractor.

400 tons, 24 to 42-inch welded steel pipe, Tacoma, Wash., to Steel Tank & Pipe Co. of Oregon, Portland, Oreg.

355 tons, three elevated tanks, Kalamazoo, Mich., to Chicago Bridge & Iron Co., Chicago.

125 tons, 48-inch sewer pipe, Jersey City, N. J., to Alco Steel Products Inc., New York.

105 tons, tar tanks, Donner-Hanna Coke Corp., Buffalo, to Buffalo Tank Corp., that city.

100 tons, 1,000,000-gallon tank, east bay municipal utility district, Oakland, Calif., to Boiler Tank & Pipe Co., Oakland, Calif.

Plate Contracts Pending

250 tons, four 600-pound boilers, specification 9074, Pearl Harbor, T. H.; bids Jan. 18.

100 tons or more, two 32 x 100-foot welded steel oil barges, United States engineer, Galveston, Tex., pro. 103, Avondale Marine Ways Inc., Avondale, New Orleans, low, $26,238.

Unstated, surge tank and discharge pipe, Spec. 1165-D., for Owyhee project; bids, Denver, Jan. 18.

Unstated, boiler plant and equipment for Puget Sound navy yard; C. C. Moore & Co., San Francisco, general contractor.

Bars

Bar Prices, Page 70

Cleveland — Recovery from the current seasonal letdown in automotive bar demand is anticipated early in February, while moderate improvement in needs of farm equipment builders is counted on to help support business the remainder of January. Bar mill operations generally are unchanged, with deliveries available within a week in some instances.

Chicago—Carbon and alloy bar demand is tending upward slightly, but volume still is below the December peak. Some improvement is noted in orders from tractor builders, but automotive requirements continue the leading single support to business.

New York — Bar business has started off the new year slowly, though sellers anticipate a reasonably good quarter. Consumer stocks are low, and some replacement buying is anticipated shortly. Auto parts makers show more interest in the market, while demand from government shops is expected to be well sustained, particularly for cold drawn and hot alloy material.

Philadelphia—Miscellaneous business in both cold drawn bar specifications is slightly better, though warehouses have contributed little tonnage and the district redrawing mill is specifying lightly. The tool trade is somewhat busier. Prices are steady.

Buffalo—A pickup in structural activity is aiding bar mill schedules, with expansion in concrete bar orders also a supporting factor. Demand from automotive interests has shown little change lately. Bar output averages 50 to 60 per cent.

Birmingham, Ala.—Output of bars continues satisfactory and on a basis estimated slightly over 60 per cent. Demand from manufacturers of agricultural implements continues fairly satisfactory and indications are output will remain consistent for the time being, at least.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 71

Bolt, nut and rivet demand is counted on for better activity later in the quarter, business currently being retarded by forward buying last month prior to the strengthening of prices. Automotive requirements at present are lighter, but sellers believe this business will be sustained for the quarter as a whole. Construction needs are unusually active for this season, while consumption by farm equipment builders is tending upward gradually.

Pipe

Pipe Prices, Page 71

Pittsburgh—Pipe demand and production hold about the December levels, with more active inquiries pointing to some improvement in business later this month. Demand is unbalanced by the preponderence of automotive tonnage, though restocking by jobbers is expected to quicken standard pipe. The season is restricting activity in oil country goods. An order for 15,000 tons of line pipe for Illinois Pipe Line Co. has been divided among three producers.

Cleveland — Standard steel pipe shipments by jobbers are slightly heavier, reflecting improved demand for industrial extensions and repairs. Cast pipe is quiet, though a number of projects will be up for bids late this month.

Chicago—Cast iron pipe demand is maintained by public works requirements and pipe replacements in subway construction. Third section, Chicago subway, involves 101 tons cast iron pipe and accessories, but considerably more tonnage will be bought by the city on separate bids. Orders for spring delivery to private construction are expected to tend upward.

New York—Several sizable tonnages for housing projects still are pending here, while completion of inventory taking by warehouses is providing more life to the pipe market. Business has been retarded the past two months by the strike of plumbing supply truckmen, a condition expected to be remedied shortly. Jersey City has placed 135 tons of steel sewer pipe.

Purchase of about 3500 tons by New York city is outstanding in cast pipe. Four foundries shared in the order, which also included several hundred tons of fittings. Other awards include 1100 tons for a Green Haven, N. Y. prison. Inquiries are heavier.

San Francisco—Only two cast iron pipe awards of size were reported placed and involved 350 tons of 2 to 8-in. pipe for Laguna Beach, Calif., to American Cast Iron Pipe Co. and 118 tons of 6 and 8-in., Class 250 pipe for Burbank, Calif., to United States Pipe & Foundry Co. Awards totaled 539 tons, compared

with 215 tons for the first week of 1938.

Cast Pipe Placed

3125 tons, 20-inch and under, cement-lined, department of purchase, New York, to United States Pipe & Foundry Co., Burlington, N. J.; Warren Foundry & Pipe Co., Phillipsburg, N. J.; R. D. Wood & Co., Florence, N. J., and Donaldson Iron Works, Emaus, Pa.; most to first named.

1100 tons, 12-inch, prison, Green Haven, N. Y., to United States Pipe & Foundry Co., Burlington, N. J.; Cleverock Inc., New York, general contractor.

368 tons, 12-inch, cement-lined, department of purchase, New York, to Donaldson Iron Works, Emaus, Pa.

350 tons, 2 to 8-inch, Laguna Beach, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

300 tons, 6 and 8-inch, Weiser, Idaho, to Pacific States Cast Iron Pipe Co., Provo, Utah; West Coast Construction Co., Seattle, general contractor.

120 tons, 6 and 8-inch, class 250, Burbank, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

15,000 tons, 10¾ and 12¾-inch for Illinois Pipe Line Line Co., division Ohio Oil Co., to Jones & Laughlin Steel Corp., Pittsburgh, National Tube Co., Pittsburgh, and Youngstown Sheet & Tube Co., Youngstown, O.

135 tons, 48-inch sewer pipe, Jersey City, N. J., to Alco Steel Products Inc., New York.

Cast Pipe Pending

900 tons, various sizes, sewage disposal plant, Bowery Bay, Queens, N. Y.; through contractor.

797 tons, 4 and 6-inch, east bay municipal utility district, Oakland, Calif.; bids Jan. 11.

107 tons, state project, Poughkeepsie, N. Y.; bids Jan. 18.

Steel Pipe Pending

1000 tons 42-inch pipe, 7/16-inch plates, city of Harrisburg, Pa.; Columbia Foundation, Philadelphia, general contractor.

Wire

Wire Prices, Page 71

New York—Buying of wire products has recovered encouragingly, affecting rope, cable and heavier goods principally. Most automotive buying is for accessory producers, direct purchasing lagging. Consumer inventories of manufacturers' wire generally are low. Spring wire buying has slackened, particularly by the furniture trade.

Pittsburgh—Jobber inquiries for merchant wire products point to improved buying later this month, following the ebbing of a spurt in demand a week ago. Manufacturers' wire activity is back to December levels, with automotive and miscellaneous demand, largely for fill-in purposes accounting for principal support. Farm equipment makers are busier, and good buying of merchant products in agricultural districts is seen for spring. Prices are firm except for minor weakness in merchant products in the East and South.

Chicago—Demand for wire and wire products is slightly heavier, but further gains await better activity on the part of larger consumers. Automotive needs are steady, with additional buying looked for shortly. Little improvement in farm demand for wire products is in immediate prospect.

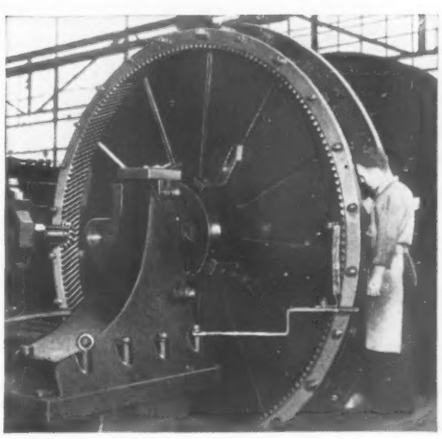
Cleveland — Business is holding about the rate a month ago despite a seasonal decline in automotive needs in recent weeks. Specifications from miscellaneous consumers and from farm districts have increased sufficiently to offset the lull in buying by auto partsmakers. Wire and rod prices are firm.

Birmingham, Ala.—Due in large part to action of jobbers and dealers

Now You Can Get INTERNAL GEARS

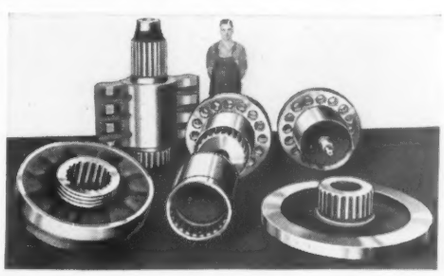
Accurately Generated In Any Size up to 18 Feet Diameter

By making internal gears available in any size up to 18-feet diameter, 12-inch face and 1¼ D.P., and generated with either spur or helical teeth, Farrel engineers have narrowed another limitation of gear design and broadened the field of application. Internal gears of large size often meet design and operating conditions better than other types of gears. Designers may now make use of internal gears in many applications where formerly they were inhibited by inability to obtain satisfactory gears with generated internal teeth in the larger sizes.



Internal single helical gear for driving 12-foot boring mill, 30° right-hand helix, 124.666"diameter, 8½" face.

We have unusual facilities for making internal gears. They are accurately generated by the Sykes process, made for smooth, quiet operation and long life under the toughest conditions.



These splined parts for operating Boulder Dam butterfly valves illustrate the unique facilities of our gear plant. The large difference between the outside and spline diameters requires unusual equipment. Both internal and external splines are generated with short involute teeth, a very economical way of producing large splined shafts.

FARREL SYKES GEARS

FARREL-BIRMINGHAM COMPANY, Inc.
322 VULCAN STREET - - - - - BUFFALO, N. Y.
The Gear with a Backbone

Behind the Scenes with STEEL

And the Diesel Goes!

■ In Pittsburgh there are many gatherings of leading lights of American Industry who daily settle the trials of the world and of business over the noonday pottage. Among these is one composed of higher-ups in publishing, public relations and news-disseminating with a sprinkling of attorneys to balance. One of the problems which recently arose was the difference between gasoline and diesel engines, and in order to settle the question W. T. Mossman of J. & L. was detailed to get the dope on the diesel from Norman Wilson, president of Monongahela Connecting railroad which operates a number of diesel locomotives. The first report from Mr. Wilson was rejected as being too technical, so his second one read: "It is suggested you disregard the report on the subject of What Makes the Diesel Go sent you yesterday as it appears to be too technical for you and your friends even though phrased in words of one syllable. Perhaps this supplemental report will be of more value. This is what makes the diesel go—The conductor waves his hand to the engineer who blows the whistle (i.e. toot, toot, toot) and the diesel goes!"

No More Engine No. 9

■ The serial number on that slick new Union Pacific locomotive built by General Electric and described in STEEL last week is: 2-C-C-2-342/530-6GE725. No wonder it develops 5000 h.p.!

Horseless Carriage Days

■ Many an oldster's eyes were wet with nostalgic tears at the Gay 90's party staged by AC Spark Plug Co. in Detroit's Hotel Statler last Tuesday and Wednesday evenings, as the singing waiters' quartet gave out with *Wait 'Til the Sun Shines, Nellie, After the Ball, Only a Bird in a Gilded Cage,* and other favorites of that tinseled era. Celebrating its thirtieth anniversary, the company had erected a complete emporium for dispensing potables and free lunch, known as the Crystal House. The night we wedged our way in about 700 guests jampacked the place, and conviviality reigned supreme. A five-piece German band blared forth in true old-time fashion, Prof. Ivor Y. Fortissimo tore heartrending ballads from the piano, and a bulbous-nosed policeman ran in anyone who gave evidence of not enjoying himself. Scenic effects were profuse and strictly legitimate. Posters of the Whoopee Girls, John L. Sullivan, Bob Fitzsimmons and Jim Jeffries hung along side lithographs of Custer's Last Stand and Washington at Valley Forge. Two bars did a rushing business, a placard over one proclaiming, "You may have an honest face, but we can't get it in the cash register." And if this weren't an upstanding family paper we might even tell you what we saw when we opened a little door marked "Gents". How she ever got in there! All in all, it was really quite a party and company hosts, L. Clifford Goad, Wilson S. Isherwood, C. W. McKinley and Earl McGinnis are to be congratulated for staging such a bang-up affair.

Buffalo Shindig

■ Another swell party, apparently, was the one thrown by Niagara Machine & Tool Works over the holidays, with boss G. R. Kinney doing the Lambeth Walk and everyone having a marvelous time until the wee hours of a cold and snowy morning.

Friends of Joyce Kilmer

■ The January 3 police blotter in suburban Lakewood carried this report: "Person reports six men sitting in an automobile on Rosewood avenue acting very suspiciously. Squad found men to be all right. Were working on WPA tree surgery survey." The prospective patient seems to have been a little elm shoot they were waiting for to grow up.

—SHRDLU

in restocking, wire products have held a steady production rate, now something better than 60 per cent. Birmingham and Gadsden mills report orders consistent and well diversified.

Rails, Cars

Track Material Prices, Page 71

Railroad activity is increasing slightly, though rail and rolling stock inquiry is far below usual volume for this part of the year. Union Pacific is preparing to place its requirement of 100,000 tons of rails and accessories.

New York, New Haven & Hartford has divided 9000 tons of rails equally between Carnegie-Illinois Steel Corp. and Bethlehem Steel Co., with 6000 tons yet to be placed. Southern Pacific is expected to ask bids soon for 25,000 tons of 119 and 131-pound rails. Spokane, Portland & Seattle is in the market for 4000 tons of rails. Southern Pacific plans to buy 40 and Union Pacific 15 locomotives.

American Car & Foundry Motors Co., New York, has booked 20 parlor coaches for South-Eastern Greyhound lines, Lexington, Ky., making 98 from this builder in four years. The same purchaser has taken delivery on four air-conditioned coaches for fast service from Cincinnati to Jacksonville, Fla., including lunch bar and toilet.

The Pennsylvania has placed orders for 15 diners and 12 coaches. Southern Pacific is asking bids for 40 locomotives and Union Pacific for 15.

Car Orders Placed

Pennsylvania, 15 diners and 12 coaches; coaches to Edward G. Budd Mfg. Co., Philadelphia; five diners each to Edward G. Budd Mfg. Co., Pullman Standard Car Mfg. Co., Chicago, and American Car & Foundry Co., New York.

Locomotives Placed

Minnesota Transfer, three 900-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

Rail Orders Placed

New York, New Haven & Hartford, 9000 tons; 4500 tons each to Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.; 6000 tons remain to be placed.

St. Louis-San Francisco, 15,500 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Car Orders Pending

Lehigh & New England, 100 50-ton hopper cars; bids asked.

Locomotives Pending

Southern Pacific, 40 locomotives; bids asked.
Union Pacific, 15 locomotives; bids asked.

Rail Orders Pending

Southern Pacific, 25,000 tons 119 and 131-pound and fastenings; bids asked soon.
Spokane, Portland & Seattle, 4000 tons; bids asked.

Shapes

Structural Shape Prices, Page 70

New York—Structural steel tonnage awards are down, but new inquiry has declined even sharper with the closing of general estimates on a large volume of public work, steel for a substantial volume of which still pends. The number of contracts placed is maintained, mostly public work. New York state bridges up for bids or pending account for close to 1500 tons. Fabricated structural steel prices are still weak.

Pittsburgh — Structural market continues active, paced by Federal grants for construction. Awards are running ahead of new inquiries, following the recent trend and a reversal of December. Private jobs are few, the outstanding one involving 700 tons for an addition to the Lever Bros. plant, Cambridge, Mass. Largest award involves 5020 tons for the machine shop Mare Island navy yard, Calif., awarded to American Bridge Co., Pittsburgh.

Koppers Co., Bartlett-Hayward division, has submitted low bid at $137,800 for six sluice gates in Mahoning dam in western Pennsylvania. Hunter Steel Co., Pittsburgh, was low on conduit liners for the same project.

Chicago—Structural inquiries are lighter, following the closing on a large number of public projects in previous weeks. Small inquiries still are numerous, but only a few large jobs have come up for bids lately. A fair grounds pavilion at Indianapolis will take 1750 tons, and ten Indiana bridges involve 700 tons.

Philadelphia—New projects are few, although fabricators are encouraged over slightly more public work. E. I. DuPont de Nemours & Co., Wilmington, Del., is expected to place over 1000 tons in March for new Seaford, Del., plant.

Buffalo—The first bidding dates for school projects were announced recently. At least 20 more are expected to be bid during the next two months. The $350,000 state normal school at Fredonia, will be bid Jan. 26 and a $230,000 central school at Livonia, N. Y., is up Jan. 20.

Cleveland — Structural inquiries continue to increase moderately, while the volume of awards remain substantially unchanged. Fabricators are fairly active on present backlogs. Fabricated prices are weak.

Birmingham, Ala. — Some disappointment is expressed at failure of shape business to materialize as had been anticipated. Output is in fair volume with most of it going into government financed projects.

San Francisco—Structural awards

Shape Awards Compared

	Tons
Week ended Jan. 14	27,885
Week ended Jan. 7	42,858
Week ended Dec. 31	32,921
This week, 1938	15,625
Weekly average, year, 1938	21,566
Weekly average, 1939	35,377
Weekly average December	30,283
Total to date, 1938	32,312
Total to date, 1939	70,743

Includes awards of 100 tons or more.

Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of $.65 per ton was *reduced* to $.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.

BLAW-KNOX *Digging and Rehandling* **BUCKETS**

BLAW-KNOX DIVISION
• OF BLAW-KNOX CO. •
Farmers Bank Bldg. Pittsburgh, Pa.

totaled 947 tons, compared with 700 tons for the first week during 1938. Bids open on Jan. 25, under specification 9003 at Washington, D. C., for a jib crane for the Mare Island, Calif., and Bremerton, Wash., navy yards.

Shape Contracts Placed

5020 tons, machine shop, U. S. navy, Mare Island, Calif., to American Bridge Co., Pittsburgh.

1650 tons, home for soldiers, Rocky Hill, Conn., to Ingalls Iron Works, Birmingham; through F. H. McGraw & Co. Inc., Hartford.

1575 tons, Oceanic bridge, Rumson, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Fred T. Ley & Co., New York.

1510 tons, power house, Duke Power Co., Cliffside, N. C., to Virginia Bridge Co., Roanoke, Va.

1300 tons, bridge, FAP-71-BI, Selma, Ala., to Nashville Bridge Co., Nashville, Tenn.

1000 tons, state bridges 389 and 390, Sparta, Wis., to Milwaukee Bridge Co., Milwaukee.

922 tons, highway bridge, Gardiner, Mont., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

905 tons, ordnance storehouse, No. 196, Washington, to Barber & Ross, that city.

740 tons, Citadel armory, Charleston, S. C., to Virginia Bridge Co., Roanoke, Va.

725 tons, junior-senior high school, Long Beach, N. Y., to American Bridge Co., Pittsburgh.

600 tons, state bridge over Chickahoming river, Williamsburg, Va., to Bethlehem Steel Corp., Bethlehem, Pa.

600 tons, south vocational school, board of education, Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

555 tons, infirmary building, Uncas-on-Thames, Norwich, Conn., to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, piling, jetties, Seabright, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Tomas Proctor, Long Beach, N. Y.

445 tons, arch forms, Pensacola dam, Vinita, Okla., to Blaw-Knox Co., Pittsburgh.

410 tons, department of justice building, Raleigh, N. C., to Ingalls Iron Works, Birmingham, Ala.

388 tons, hospital building, Middletown, Conn., to Berlin Construction Co., Berlin, Conn.; through Tremeglio Bros., Waterbury, Conn.

350 tons, school auditorium, Sisters of Third Order of St. Francis, Baltimore, to Baltimore Steel Co., Baltimore.

350 tons, public school No. 142, Coles street, Brooklyn, to Lehigh Structural Steel Co., Allentown, Pa.

335 tons, three bridges, Passaic county, New Jersey, to American Bridge Co., Pittsburgh; through William Eisenberg Co., Camden, N. J.

330 tons, high school, Frederick, Md., to Rosslyn Steel & Cement Co., Rosslyn, Md.

300 tons, Fort Green health center, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

300 tons, bridge over Red river, Shelly, Minn., for states of North Dakota and Minnesota, to Illinois Steel Bridge Co., Jacksonville, Ill.

300 tons, warehouses, Venezuelan government, to Belmont Iron Works, Philadelphia.

280 tons, central school, board of education, South Kortright, N. Y., to American Bridge Co., Pittsburgh.

275 tons, bridge over Red river, Neillsville, Minn., for states of North Dakota and Minnesota, to American Bridge Co., Fittsburgh.

265 tons, state bridge, Harrison, Ill., to St. Louis Structural Steel Co., East St. Louis, Ill.

260 tons, state bridge, Pike county, Ohio, to Bethlehem Steel Co., Bethlehem, Pa.

255 tons, bridges, Keokuk county, Iowa, 150 tons to Pittsburgh-Des Moines Steel Co., Pittsburgh, and 105 tons to Des Moines Steel Co., Des Moines, Iowa.

255 tons, cantilever girders, McLarin, Miss., to Virginia Bridge Co., Roanoke, Va.

250 tons, two canal bridges, Lawrence, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; through Central Construction Co., Lawrence.

235 tons, factory, Hope Windows Inc., Jamestown, N. Y., to Central Steel Construction Co., Bronx, N. Y.

230 tons, Lock Harbor bridge, Tennessee valley authority, Gilbertsville, Ky., to American Bridge Co., Pittsburgh.

225 tons, city hospital, Binghamton, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.

225 tons, steel plate girder bridge, Norwich, Conn., to Harris Structural Steel Co., New York; Frank Westcott, North Attleboro, Mass., general contractor.

215 tons, bridge, WPNS-437, Cambridge, Md., to American Bridge Co., Pittsburgh.

200 tons, men's dormitory, Michigan college of Mining Technology, Houghton, Mich., to Worden-Allen Co., Milwaukee.

195 tons, Central school, Brocton, N. Y., to Ernst Iron Works Inc., Buffalo.

190 tons, bridge, section 5BF-1, Mitchell, Ill., to St. Louis Structural Steel Co., East St. Louis, Ill.

180 tons, Riverside school, No. 7, Elmira, N. Y., to American Bridge Co., Pittsburgh.

180 tons, inspection stations, Washington, to Fort Pitt Bridge Works, Pittsburgh.

175 tons, beam spans, bridge 405, Ashland, Wis., for state, to Wausau Iron Works, Wausau, Wis.

170 tons, library, Virginia Military institute, Lexington, Va., to Virginia Bridge Co., Roanoke, Va.

165 tons, plate girder span, Ottumwa, Iowa, 90 tons to Ottumwa Bridge Construction Co., that city, and 75 tons to American Bridge Co., Pittsburgh.

160 tons, central school, board of education, Argyle, N. Y., to American Bridge Co., Pittsburgh.

160 tons, cell block building 35, Coxsackie, N. Y., for state, to American Bridge Co., Pittsburgh.

150 tons, state home for soldiers, Rocky Hill, Conn., to Ingalls Iron Works, Birmingham, Ala.; through F. H. McGraw & Co. Inc., Hartford.

145 tons, segregation building, Bedford Hills, N. Y., to Weatherly Steel Co., Weatherly, Pa.

140 tons, home economics building, University of Maryland, to Dietrich Bros., Baltimore; through James Stewart & Co., New York.

140 tons, warehouse, Fanbar Holding Corp., Long Island City, N. Y., to American Bridge Co., Pittsburgh.

135 tons, Kellogg avenue bridge repairs, Cincinnati, to Carnegie-Illinois Steel Corp., Pittsburgh.

130 tons, Scott school addition, Chicago, to Atlas Iron Works Corp., Chicago.

130 tons, cantilever girders, Merrill, Miss., to Virginia Bridge Co., Roanoke, Va.

120 tons, senior high school, board of education, Waverly, N. Y., to American Bridge Co., Pittsburgh.

120 tons, transportation and fire station building, U. S. treasury department, Great Lakes, Ill., to Gage Structural Steel Co., Chicago.

120 tons, Central school, Nassau, Long Island, N. Y., to James McKinney & Son, Albany, N. Y.

110 tons, Louisville-Nashville roundhouse alterations, South Louisville, Ky., to American Bridge Co., Pittsburgh.

110 tons, state bridge, Archbald Boro, Pa., to American Bridge Co., Pittsburgh.

105 tons, bridge, Van Wert county, Ohio, to Berger Iron Co., Akron, O.

105 tons, 3-span I-beam bridge, Huntington, Vt., to American Bridge Co.; M. DeGroot, Jericho, Vt., general contractor, $38,038.40; lump sum on steel superstructure being $8000.

100 tons, bridges Nos. 1 and 2, Youngstown, O., to Sauce Engineering Co.

100 tons, radial gates and hoists, New Briar Canal, Boulder project, Calif., to Pacific Iron & Steel Co.

100 tons, warehouse, Granby, Colorado-Big Thompson project, Colo., to unnamed interest.

100 tons, terminal warehouse, Baltimore & Ohio railroad, Cleveland, to Republic Structural Iron Works, Cleveland.

Shape Contracts Pending

1750 tons, livestock pavilion, state fair grounds, Indianapolis.

1156 tons, also 466 tons reinforcing Unit 3, Lake Washington pontoon bridge, Seattle; General Construction Co., Seattle, and Columbia Construction Co., Bonneville, combined contractors and not as previously reported.

950 tons, state highway bridge, Montgomery county, New York.

800 tons, state office building, Columbia, S. C.

700 tons, ten bridges, state of Indiana.

700 tons, state training school and hospital for feeble minded, Southbury, Conn.

700 tons, addition to building, Lever Bros., Cambridge, Mass.

600 tons, piling, Carter road bridge, Cleveland; bids in, also includes 160 tons of reinforcing bars.

400 tons, piling Cuyahoga river straightening project; bids Jan. 23.

480 tons, power house, Bonneville dam, Oregon; general contract to L. H. Hoffman, 715 S. W. Columbia, Portland, Oreg., at $1,169,000.

400 tons, Bowery Bay sewage plant, New York.

365 tons, state bridge over Westfield river, Cummington, Mass.

300 tons, state bridge, contract 1756, Morristown, Ind.

265 tons, trestle for car dumper, Pennsylvania railroad, Sandusky, O.

230 tons, third section, Chicago subway, bids Feb. 2.

214 tons, and 46 tons plates, undercrossing, Chapman street on Rosemead boulevard for county of Los Angeles, Calif.; bids Jan. 26.

200 tons, physical science building, Indiana university, Bloomington, Ind.

180 tons, Cross Island parkway grade separation, Queens, New York.

175 tons, state highway bridge, Orange county, New York.

150 tons, physical science building, Indiana university, Bloomington, Ind.

150 tons, public library building, Mason City, Iowa.

150 tons, repairs to bridges, Chicago, Burlington & Quincy railroad, Wyanet, Ill.

135 tons, state bridge, contract 1759, Brownstown, Ind.

125 tons, state bridge Adams county, Washington; Henry Hagman, Cashmere, general contractor.

100 tons, one jib crane for Mare Island, Calif., and Bremerton, Wash., navy yards, specification 9003; bids Jan. 25.

100 tons, state bridge Snohomish county, Washington; A. W. Stevens, Mt. Vernon, general contractor.

Unstated 18 cast steel pier noses for Coulee power plant; Enterprise Foundry Co., San Francisco, low.

Unstated, miscellaneous metal work, Spec. 1167-D, Rock Island dam,

Columbia river; bids to Denver Jan. 20.

Unstated, gate hoists, Spec. 1168-D, fish ladder overflow gate, Roza dam, Washington state; bids to Denver Jan. 23.

Reinforcing

Reinforcing Bar Prices, Page 71

New York—Reinforcing steel buying is sustained by purchases for requirements to cover contracts previously bid, closed under the public works program, but new inquiry is off slightly. However, pending needs for such type of construction is still substantial and new inquiry includes 1535 tons for a sewage treatment plant, Bowery Bay, Queens. Prices are still weak and erratic.

Pittsburgh—Prices have weakened noticeably in some sections, although tonnages placed continue to be large and new jobs are coming out in good volume. Recently a section of work on the Panama canal was let, with bids announced by the federal government running to a low of 1.45c, Sparrows Point. This job involves 750 tons of concrete bars and was awarded to Bethlehem Steel Co., Bethlehem, Pa., the largest tonnage involved over the past few days.

Cleveland — Reinforcing awards are restricted to miscellaneous small tonnages. Public work dominates the current outlook. Fabricated prices continue to reflect the scarcity of new work.

Chicago—Reinforcing bar demand continues active, with favorable weather aiding construction. Outstanding award is 700 tons for an air corps barracks, Rantoul, Ill. Plans for the third section of the Chicago subway will be out soon. Continued price irregularities on the more attractive jobs are reported.

Philadelphia—No projects of consequence have been reported recently. The Harrisburg-Pittsburgh express highway will be extended directly to Philadelphia navy yard at cost of $30,000,000, as part of defense program.

Concrete Bars Compared

	Tons
Week ended Jan. 14	**15,290**
Week ended Jan. 7	**1,060**
Week ended Dec. 31	**5,153**
This week, 1938	**8,717**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**8,175**
Weekly average, December	**8,973**
Total to date, 1938	**18,776**
Total to date, 1939	**16,350**

Includes awards of 100 tons or more.

Reinforcing Steel Awards

2460 tons, power house, Shasta dam project, Calif., to Bethlehem Steel Co., Bethlehem, Pa., at $119,780.80.

1458 tons, treasury department, list 2108, Los Angeles, to Bethlehem Steel Co., Los Angeles.

1400 tons, Pasadena, Calif., to Bethlehem Steel Co., Los Angeles.

750 tons, Oceanic bridge, Rumson, N. J., 550 tons, reinforcing bars, to Concrete Steel Co., New York, and 200 tons, reinforcing trusses, Jones & Laughlin Steel Corp., Pittsburgh; Fred T. Ley & Co., New York, general contractor, formerly reported to unstated interests.

750 tons, Panama Canal Zone, to Bethlehem Steel Co., Bethlehem, Pa.

700 tons, superstructure for 2200-man barracks, U. S. army air corps, Chanute Field, Rantoul, Ill., to Joseph T. Ryerson & Son Inc., Chicago; through Lipman Construction Co., Chicago.

650 tons, Federal penitentiary, Texarkana, Ark., to Laclede Steel Co., St. Louis.

610 tons, outfall sewer, Decatur, Ill., to Laclede Steel Co., St. Louis; File & Collins & Burt Bros., contractor.

575 tons, blocks 1, 2, 4 and 5, East End housing project, Louisville, Ky., to American Builders Supply Co., Louisville, Ky.; G. H. Rommel Co., Louisville, general contractor.

500 tons, barracks, U. S. quartermaster, Holabird, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Consolidated Engineering Co., contractor.

420 tons, East Forty-fifth street viaduct, Seattle, to Northwest Steel Rolling Mills, Seattle; Western Construction Co., Seattle, general contractor.

415 tons, addition to capitol buildings, Olympia, Wash., to Seattle Steel Co., Seattle; MacDonald Building Co., Tacoma, general contractor.

470 tons, including 270 trusses, to Ceco Steel Products Co., Jersey City, N. J.; through Duffy Construction Co., New York.

400 tons, sewer job, WPA, Omaha, Nebr., to Sheffield Steel Corp., Kansas City.

375 tons, substructure, Plumb Beach Channel bridge, New York, to Jones & Laughlin Steel Corp., Pittsburgh; Arundel Corp., Baltimore, general contractor.

310 tons, sewage treatment plant, Anderson, Ind., to Truscon Steel Co., Youngstown, O.

305 tons, highway project, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through A. W. Banko Inc., Wingfield, N. Y.

300 tons, foundations, navy yard shop, Washington, to Rosslyn Steel & Cement Co., Rosslyn, Va.; W. P. Thurston Co., Richmond, Va., general contractor .

275 tons, grade crossing, Woodbridge, N. J., to Truscon Steel Co., Youngstown, O.; Fulhaver Construction Co., Newark, general contractor.

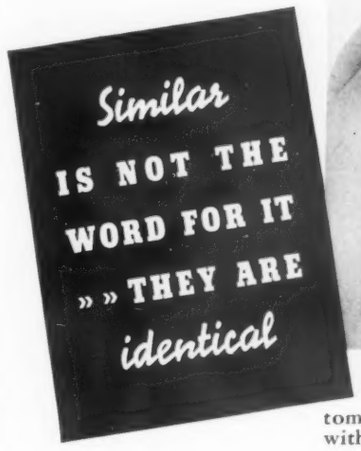
270 tons, school, Dillon, Mont., to Bethlehem Steel Co., Bethlehem, Pa.

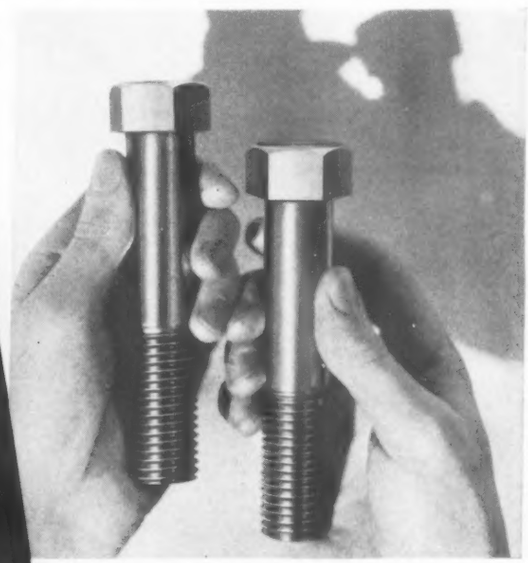
265 tons, 375-man barracks, Fort Thomas, Kentucky, to Carnegie-Illinois Steel Corp., Pittsburgh; F. H. McGraw & Co., Middleton, O., general contractor.

260 tons, grade elimination, Farmers boulevard, Queens, N. Y., to Truscon Steel Co., Youngstown, O.; Poirier & McLane Corp., New York, general contractor; contract also includes substantial tonnage of mesh for paving.

250 tons, high school, Marshfield, Wis.,

BY THE BOX OR BY THE MILLION





• Accuracy of size and fit of Cleveland Cap Screws is accepted as a matter of course by our old customers—but those who have just become acquainted with them are amazed at the uniform high quality standards we are able to maintain. Due to the Kaufman Process, *patented,* our own plant development, close limits of accuracy are easily maintained in making cap screws today. Besides a Class 3 fit however we offer a stronger screw in both head and thread than is usually expected. And of course in a full list of sizes, both fine and course thread. THE CLEVELAND CAP SCREW COMPANY, 2935 E. 79th St., Cleveland, O.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

to Truscon Steel Co., Youngstown, O.
225 tons, Masonic temple, Marquette, Mich., to Bethlehem Steel Co., Bethlehem, Pa.; Western Construction Co., contractor.
200 tons, second addition, sewage plant, Madison, Wis., to Joseph T. Ryerson & Son Inc., Chicago; Paul Naftegaal & Son, contractor.
200 tons, schools, Brainard, Minn., to Truscon Steel Co., Younstown, O.; George Lounsberry, contractor.
180 tons, highway project, Moshula avenue, Bronx, New York, to Joseph T. Ryerson & Son Inc., Jersey City; Foley Bros., New York, general contractor.
148 tons, highway work, Mojave county, Arizona, to unnamed interest.
145 tons, trade school, New Britain, Conn., to Topper & Griggs, Hartford; Fusco & Amatuda, New Haven, general contractors. Berlin Iron Works, Bertin, Conn., awarded 50 tons, structural steel.
140 tons, employes' dormitories, Koch hospital, St. Louis, to Laclede Steel Co., St. Louis.
140 tons, girls' dormitory, Michigan State college, East Lansing, Mich., to Great Lakes Steel Corp., Detroit, through Ceco Steel Products Corp. Alfred Smith, contractor.
140 tons, school, Paterson, N. J., and dining hall, Lyons, N. J., to Ceco Steel Products Corp., Jersey City, N. J.; through C. H. Johannsen & Co., Cliffside Park, N. J.
133 tons, hospital, Marinette, Wis., to Bethlehem Steel Co., Chicago.
130 tons, highway bridge, Decatur, Kans., to Sheffield Steel Corp., Kansas City.
120 tons, state procurement office, projects, Chicago, to Worden-Allen Co., Chicago.
111 tons, purchasing agent, Los Angeles, specification 3855, to Los Angeles Iron & Steel Co., Los Angeles.
110 tons, school addition, Moline, Ill., to Bethlehem Steel Co., Bethlehem, Pa.
100 tons, San Antonio wash bridge, San Bernardino county, California, to unnamed interest.
100 tons, power plant, Newberry, Mich., to Bethlehem Steel Co., Bethlehem, Pa.
100 tons, Cancer institute, Madison, Wis., to Truscon Steel Co., Youngsown, O.
100 tons, high school, Portage, Wis., to Bethlehem Steel Co., Bethlehem, Pa.
100 tons, high school, Two Harbors, Minn., to Bethlehem Steel Co., Bethlehem, Pa.; Lenci & Englund, contractors.

Reinforcing Steel Pending

15,000 tons, for metropolitan district water viaduct, Boston; approximately 30,000 tons of plates and sheets also involved.
3240 tons, power house, Bonneville dam, Oregon; general contract to L. H. Hoffman, 715 S. W. Columbia, Portland, Oreg. at $1,169,000.
3150 tons, third section, Chicago subway, bids Feb. 2.
1535 tons, sewage treatment plant, Bowery Bay, Queens, N. Y.; bids Jan. 18.
1500 tons, 3200-men barracks, Hickman Field, T. H.; Robt. E. McKee Inc., 4700 San Fernando Road, Los Angeles, low on general contract at $1,039,000.
1263 tons, Roza project, Washington state; bids in to bureau of reclamation.
800 tons, department store, F. & R. Lazarus Co., Columbus, O.
590 tons, hospital, Wilmington, Del.; George A. Fuller Construction Co., Wilmington, low.
550 tons, National Institute of Health, Bethesda, Md.
500 tons, highway project, Little Falls, N. Y.; Bates & Rodgers, New York, general contractors.
461 tons, water storage project, Manitowoc, Wis.; A. L. Jackson, general contractor.
425 tons, state highway project, group C; bids in Jan. 13, Hartford; substantial tonnage included in group D and E to be bid shortly.
417 tons, piling, bulkhead, route 35, section 9; Belmare, N. J.; Gray Construction Corp., Morristown, N. J., low.
400 tons, state hospital, Kalamazoo, Mich.
375 tons, contract 3, East Side drive, New York; A. M. Hazel, New York, general contractor.
370 tons, sewer, Cincinnati.
320 tons, Washington state highway projects, including 260 tons for bridge in Spokane county; Alloway & Georg, Spokane, general contractor.
283 tons, underpass, route 6, sec. 8A, Clifton, N. J.; Union Building & Construction Corp., Passaic, N. J., low.
250 tons, 7-story apartment, Ocean and Arizona avenue, Santa Monica, Calif.; bids being taken.
240 tons, Gregory hall, Urbana, Ill.; William O'Neil Construction Co., general contractor.
220 tons, ward buildings hospital for insane, Manteno, Ill.
175 tons, marine hospital, Stapleton, Staten Island, N. Y.
175 tons, hospital, Rantoul, Ill.
160 tons, medical building, state hospital, Kalamazoo, Mich.
150 tons, third unit San Luis, Obispo county, California, court house; bids opened.
140 tons, William A. Wirt memorial school, Gary, Ind.; Thomas & Jensen, Chicago, general contractor.
124 tons, Canajoharie-Palatine bridge, Montgomery county, New York.
110 tons, library, state teachers college Milwaukee.
105 tons, Eagle Point reservoir, Dubuque, Iowa.
100 tons, physical science building, Bloomington, Ind.

Pig Iron

Pig Iron Prices, Page 72

Pittsburgh—Pig iron inquiries are improved substantially, but orders recently have been light and reduced schedules of some more important consumers are holding down demand. Production is rising slowly without change in number of active furnaces. Coke output is steady.

Cleveland—Pig iron releases have increased substantially so far this month. Sellers anticipate a 15 per cent gain in January shipments over November, best month last year.

Chicago—Pig iron releases so far this month are better than expected and heavier than a month ago. Gains result largely from improved demand from producers of automotive castings. Railroad needs are increasing slightly. Consumption by heating equipment makers is quieter, while requirements of farm equipment builders are steady.

New York—With inventory-taking practically over and stocks of some melters low, broader demand is anticipated soon. Higher prices next quarter are regarded not unlikely, should business show a strong upturn. Export demand is dull, inquiries being limited to a few small tonnages.

Philadelphia—New buying is in small lots for prompt delivery, but shipments are slightly heavier, including releases from soil pipe makers. Some builders of heavy equipment also are fairly busy. The district merchant furnace has no plans to resume production immediately, although equipment is in shape to operate.

Buffalo—Shipments have extended the improvement which followed the holidays. Production holds at 64 per cent, best rate in more than a year. Principal demand is from miscellaneous consumers, with new business mostly small lots for immediate delivery.

Scrap

Scrap Prices, Page 74

Pittsburgh—Closing of railroad lists recently found export demand again bolstering prices, although part of the offerings came to local mills. Bids on these offerings indicated continued strength in the market, but consumer demand has failed to supplement it. Railroad specialties are stronger, with springs and wheels up 25 cents. Crop ends also are 25 cents higher.

Cleveland—Activity in iron and steel scrap here and in the valleys has been confined almost exclusively to routine shipments of miscellaneous grades on orders. Releases still are restricted occasionally in the Youngstown district. New business is small and quotations unchanged.

Chicago—Scrap is marking time, awaiting resumption of mill buying upon more complete recovery of holiday losses. Firmness of the present $13.50 to $14 quotation on No. 1 steel indicates higher levels when demand reappears.

New York—Scrap buying by domestic consumers continues light with prices drifting and unchanged on small demand. Some breakable cast moves to Harrisburg at $15.50, delivered, but little to Eastern Pennsylvania consumers. Most activity is for export with loading active.

Philadelphia—New business of consequence is absent, and one mill has restricted shipments of No. 1 steel and heavy cast. Brokers are offering $13.25 for No. 2, with No. 1 nominally steady at $15 to $15.50.

Buffalo—Prices are unchanged, but sentiment has been disturbed by a 50-cent cut in the bid of the principal consumer for steelmaking grades. So far dealers have not accepted the lower bid which now is

$13.50 to $14 for No. 1 steel Machine shop turnings also have weakened, as the leading user at Niagara Falls cut its prices $1. Most quotations are nominal.

Detroit—Prices are stronger on recent sales, with No. 2 heavy melting steel up 50 cents and No. 1 busheling, forge flashings and sheet bundles 25 cents higher. The market is quiet, but a good outlook for second quarter is inducing some speculative buying.

Cincinnati—The market is dull, but quotations are firm. Mills defer additional purchasing, meanwhile accepting fairly large tonnages against contracts. A strong undertone is maintaining prices in the face of poor demand, with dealers of the opinion new buying cannot be delayed much longer.

St. Louis—Scrap trading was quieted last week by the industry's annual convention here. The market is steady, and prices generally are unchanged on the possibility that deals now pending with several mills will be closed shortly. Offerings by dealers are light, adding to bullish sentiment.

Nonferrous Metals

New York—Unsettled political conditions in Europe, unfavorable price trend in Wall street, and generally light consumer demand contributed to the weaker tone in nonferrous metals abroad last week. Although tin sales increased, other domestic markets were marked by hesitancy on the part of consumers. All prices held fairly steady here.

Copper—December statistics showing an increase of 32,631 tons of world refined and 4586 tons of blister stocks including 20,268 and 3848 tons, respectively, in the United States, unsettled both London and domestic markets. Following a decline on Thursday in export copper to 10.10c, c.i.f., brass ingot sellers reduced base prices ¼ to ½-cent per pound while refiners reduced their bids for copper and brass scrap ⅛-cent to the basis of 8.62½c for No. 1 heavy.

Lead — Buying was somewhat lighter but the market is in a firm position. Sellers again quoted on the basis of 4.70c, East St. Louis.

Zinc—Producers held prices unchanged at 4.50c, East St. Louis, for prime western despite light buying.

Tin—With the International Tin committee maintaining a strict control over prices through the buffer stock, prices held unusually steady. Straits spot fluctuated between 46.55c and 46.85c. Sales increased, reflecting the upward trend in tin plate operations.

Warehouse

Warehouse Prices, Page 73

Cleveland—Warehouses are highly encouraged by business gains so far this month. January shipments are expected to exceed those of last November, best month of 1938, by 15 per cent. Orders are small but are more numerous.

Buffalo — Sales have improved slightly but are for small lots. Some large consumers shortly are expected to replenish inventories.

New York—Business is heavier,

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Jan.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
7	11.25	11.37½	10.77½	46.85	47.00	4.85	4.70	4.50	20.00	11.75	35.00
9	11.25	11.37½	10.77½	46.70	46.85	4.85	4.70	4.50	20.00	11.75	35.00
10	11.25	11.37½	10.77½	46.75	46.90	4.85	4.70	4.50	20.00	11.75	35.00
11	11.25	11.37½	10.77½	46.65	46.80	4.85	4.70	4.50	20.00	11.75	35.00
12	11.25	11.37½	10.77½	46.65	46.80	4.85	4.70	4.50	20.00	11.75	35.00
13	11.25	11.37½	10.77½	46.55	46.70	4.85	4.70	4.50	20.00	11.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.22½-6.35
Cleveland 6.50-6.75
Chicago 6.00-6.25
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 7.50-7.75
Cleveland, No. 1 ..... 7.50-7.75
Chicago, No. 1 ..... 7.50-7.75
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.40-5.65

Light Copper

New York 6.00-6.25
Cleveland 5.75-6.00
Chicago 5.87½-6.12½
St. Louis 6.00-6.25

Light Brass

Cleveland 3.25-3.50
Chicago 3.75-4.00
St. Louis 3.50-3.75

Lead

New York 4.00-4.25
Cleveland 3.50-3.75
Chicago 3.75-4.00
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 5.75-6.00
Mixed, cast, Cleveland 6.75-7.00
Clips, soft, Cleveland 13.75-14.00
Mixed cast, St. Louis 7.00-7.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads. 10.50
Standard No. 12 aluminum ... 12.75-13.25

OUR AIM is to render service. A little more complete . . . more hospitable . . . more pleasing . . . than even the most exacting guest expects.

CHAS. H. LOTT
Manager

Every Room Outside with Private Bath
Single from $2.50
Double from $4.00

DETROIT LELAND HOTEL

CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

sales the first half of January being considerably better than expected. Gains are shown in both size and number of orders.

Galvanized and galvanized copper alloy sheets have been withdrawn from commodities included in the quantity differential plan here. The former now are quoted 4.50c for 1500 pounds or less and 4.35c for 1500 pounds and over in No. 24 gage. Galvanized copper alloy sheets of the same gage are 35 cents per 100 pounds higher.

Steel in Europe

Foreign Steel Prices, Page 73

London — (*By Cable*) — Steel and iron markets in Great Britain continue quiet, the expected revival not yet materializing. Pig iron exports are practically nonexistent in spite of the recent reduction in price. Steelworks are not receiving sufficient orders to give satisfactory operation. Sheets, including galvanized, are quiet and tin plate is only moderately active.

December steel ingot production was 655,700 gross tons, a decline of 204,300 from 860,000 in November. Pig iron also declined, December output being 445,800 tons, a loss of 15,700 tons from 461,500 tons in November.

Tin Plate

Tin Plate Prices, Page 70

Tin plate specifications and production are up slightly, operations being estimated at 40 to 45 per cent. Some inquiry has appeared in anticipation of the packing season which will start shortly. Better indication of probable demand will be provided after the packers' convention in Chicago Jan. 22-27.

Ferroalloys

Ferroalloy Prices, Page 72

New York—Ferromanganese has been reduced $12.50 a ton to $80, duty paid, tidewater. Silicomanganese has been cut $9.75 on all grades, 3 per cent carbon material now being $83 a ton on contracts, freight allowed. Manganese briquets have dropped ¼-cent on carload and smaller lots, with the former now 4.50c. Ferrotungsten is stronger at $1.65 to $1.75, but business is light. Tungsten metal powder is unchanged.

Holding Our World Trade Against Foreign Threats

(*Concluded from Page* 17)

ica's most promising young industries. With production value revised upward to $140,000,000 in 1938 it was one of the few to register a gain over 1937 when output totaled $115,000,000. From all indications, production will be stepped up during 1939 and 1940 to meet growing demand for both private and national use, the latter resulting from the feverish race to rearm. It is said that production can be stepped up nearly 100 per cent with present equipment.

Importance of the world market to the aviation industry may be readily appreciated when it is noted that exports last year, including engines and spare parts, were in the neighborhood of $70,000,000 compared with $39,000,000 in 1937. American equipment for both commercial and military use may be found in every quarter of the globe. American equipment is maintaining its competitive position with the products of other nations, the most aggressive being England, France, Germany, Italy and even Russia. Foreign business over the next year or two, of course, will depend on political developments.

American manufacturers excel in mass production and other nations have been unable to compete effectively either from the standpoint of price or quality. American motor cars, as an example, continue by far the most popular abroad.

Even in countries short on dollar exchange, such as Brazil, the bulk of automotive business goes to American builders. Germany is well down in second place in Brazilian automotive trade and most of the shipments from that country are from an American-controlled company which, it is understood, employs exports to get part of the profits from its German operations out of the country.

Foreign automotive business now is showing considerable expansion with South Africa, Sweden, Belgium, Australia, and Brazil among the most promising markets for passenger cars. Argentina, Japan, Belgium and British India currently provide the most promise for truck makers.

Construction and Enterprise

Ohio

ASHLAND, O.—City, W. Mason, mayor, contemplates constructing a water softening plant to cost approximately $25,000. E. D. Barstow, Akron, O., engineer, may make the survey.

ASHLAND, O. — City, W. Mason, mayor, is preparing plans to mature about Feb. 1 for construction of a trickling filter type sewage disposal plant to cost $115,300. Consulting engineer, E. D. Barstow, Akron, O. (Noted Oct. 31.)

CHAGRIN FALLS, O.—Village, P. J. Clemens, mayor, contemplates undertaking a construction project involving a new sewage disposal plant and modernization of sewage lines. Courtney Engineering Co., Cleveland, engineer.

CLEVELAND — Eaton Mfg. Co., C. I. Ochs, president, 739 East 140th street, is asking bids on construction of a one-story, 40 x 340-foot addition to its stamping plant at cost of approximately $80,000. George S. Rider Co., Cleveland, engineer.

HILLSBORO, O. — Inter-county Rural Electric Co-operative Inc., Victor Miller, superintendent, has been allotted $230,000 loan by REA to finance projected construction of 154 miles of rural transmitting lines in four counties.

New York

CLINTON, N. Y. — City is taking bids on contract No. 2 in sewage treatment plant construction project amounting to $50,664. R. S. Cookingham, Utica, N. Y., consulting engineer.

JAMESTOWN, N. Y. — City, T. McKee, secretary of public utilities board, plans extensions and improvements at municipal light plant to cost about $30,000. C. O. Johnson, city hall, is plant superintendent.

MENANDS, N. Y. — Simmons Machine Tool Corp. has plans in progress for maturity in spring to construct a 150 x 500-foot factory costing over $40,000. Will buy equipment.

Michigan

ADRIAN, MICH.—Southeastern Michigan Rural Electric Co-operative Inc., C. C. Nyde, superintendent, has received REA allotment in the construction of 100 miles of rural electric lines costing $104,000 and will probably take bids soon.

BATTLE CREEK, MICH. — City, T. Thorne, clerk, is taking bids due 2 p.m., Feb. 2, on installation of 18 motor-driven deep well turbine pumping units complete with miscellaneous accessories.

GROSSE POINTE PARK, MICH.—Village, W. J. Burns, clerk, takes bids to Jan. 23 on equipment for storm water pumps and sewerage extensions. Drury & McNamee, Ann Arbor, Mich., consulting engineers.

MASON, MICH.—City, George Kellogg, clerk, rejected previous bids and is taking new bids due 2 p.m., Jan. 23, on additions and improvements in its sewage treatment plant. Wolverine Engineering Co., Mason, consulting engineer.

Illinois

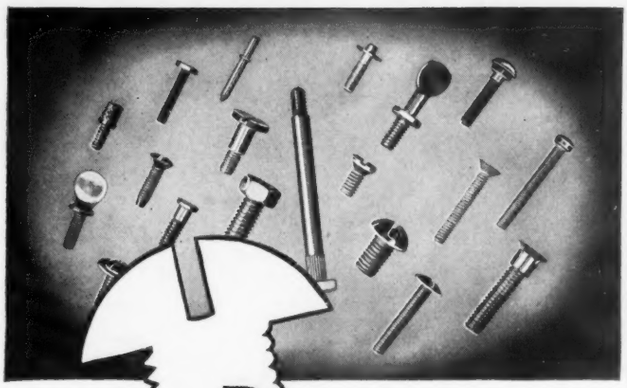
CHICAGO — Hump Hairpin Mfg. Co., 1918 South Prairie avenue, plans installation of electric power equipment in projected three-story addition to wire-making plant to cost nearly $100,000.

CHICAGO — R. R. Donnelly & Sons Co., 350 East Cermak road, plans to install electric power equipment in new two-story plant addition costing about $400,000. Albert Kahn Inc., Detroit, consulting engineer.

CHICAGO — R. Hoffman, 2710 Granville avenue, has awarded general contract to Welso Construction Co. for erection of a one-story foundry for production of gray-iron castings at cost of approximately $40,000 with equipment.

Missouri

MEXICO, MO. — Consolidated Electric co-operative has awarded $164,182 contract to Phelan Construction Co., Davenport, Iowa, for construction of 243 miles of rural transmission lines. Mid-

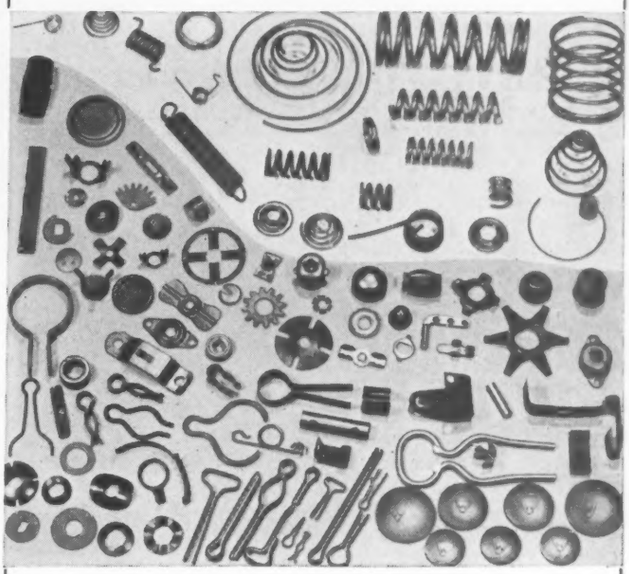


PROTECT your product — and reduce costs — at every point where fastening devices are required by using screws and headed parts by PROGRESSIVE. Let PROGRESSIVE items, produced efficiently and accurately by the cold upset process, show you the way to substantial savings both in original costs and in assembly operations. In addition to standard machine screws and nuts, PROGRESSIVE is equipped to meet demands for made-to-order parts in any metal. We invite you to submit your problems to PROGRESSIVE specialists for intelligent, prompt solution.

QUALITY PROMCO BRAND

The PROGRESSIVE MFG. CO.
TORRINGTON · · · CONNECTICUT

▲SPRINGS
▲STAMPINGS
▲WIRE FORMS



Any material, any quantity. Complete tool room. Spot-welded or tapped assemblies. Manufacturing these products thirty-four years. Consult Hubbard engineers and get the design best for your case.

M. D. Hubbard Spring Co.
645 Central Ave., Pontiac, Mich.

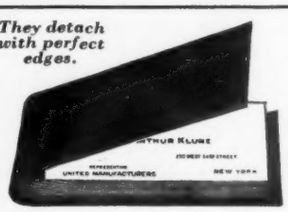
The Manufacture of Steel Sheets
By Edward S. Lawrence
This book describes the principal steps involved in the manufacture of steel sheets
244 pages
116 illustrations
Price, Postpaid $4.50 in U. S. and Canada
THE PENTON PUBLISHING COMPANY
Book Department
1213-35 W. 3rd St. Cleveland, O. 517-S.

OVERHEAD CRANES • ELECTRIC HOISTS
CRAWLER CRANES • ELECTRIC MOTORS
ARC WELDERS • WELDING ELECTRODES
WRITE FOR LITERATURE ON P&H PRODUCTS—4411 W. NATIONAL AVE., MILWAUKEE, WIS.
HARNISCHFEGER CORPORATION
HOISTS · WELDING ELECTRODES · MOTORS P&H EXCAVATORS · ELECTRIC CRANES · ARC WELDERS

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS
OHIO
THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

"COWLES"
ROTARY SLITTING KNIVES
for Modern Requirements
Highest Quality . . . . Long Service
The Product of Many Years Specialization
MADE BY TOOLMAKERS
COWLES TOOL COMPANY
Cleveland, Ohio

They detach with perfect edges.



We will gladly quote you on any quantity of genuine engraved business cards, and send you samples of what other firms are using. No charge, of course.

DON'T you feel the salesman who presents a crisp, well-arranged *genuine engraved* business card from a Wiggins Compact Binder is selling a better product, which is worth a higher price?

The John B. **WIGGINS** *Company*
1153 Fullerton Avenue, Chicago
Engravers Since 1857

THOMSON

HEADQUARTERS FOR
Manual and Automatic SPOT, SEAM, BUTT, FLASH, PROJECTION, PORTABLE GUN, FABRIC and SPECIAL RESISTANCE WELDING PRODUCTION EQUIPMENT
Write for FLASHES, a monthly magazine of Resistance Welding News and information. Sent free on request by
THOMSON-GIBB ELECTRIC WELDING CO.
General Offices: 163 PLEASANT ST., LYNN, MASS.

western Engineering & Construction Co., Tulsa, Okla., engineer.

PLATTE CITY, MO. — Platte-Clay County Electric co-operative, Howard Alexander, secretary, has received $487,000 REA allotment in the proposed construction of 456 miles rural transmission lines in three counties. E. T. Archer & Co., Kansas City, Mo., consultants.

ROCKPORT, MO.—REA has allotted $145,000 loan to Atchison-Holt Co-operative Electric association, Edmond Roup, secretary, to finance construction of 141 miles rural transmission lines. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant.

SAVANNAH, MO. — REA has allotted $240,000 to Northwest Missouri Electric co-operative, Wade Sandade, secretary, to finance projected construction of 219 miles rural power lines. E. T. Archer & Co., Kansas City, Mo., consulting engineers.

ST. LOUIS — National Vendors Inc., 5149 Natural Bridge avenue, plans to install electric power machinery in new two-story extension to its manufacturing plant. Cost estimated to exceed $65,000.

Arkansas

ROGERS, ARK.—Benton County Rural Power committee, H. N. Renfro, chairman, has received REA grant of $307,000 for constructing 307 miles of rural electric transmission lines. William Massey, Berryville, Ark., engineer on project.

Oklahoma

ADA, OKLA. — Inter-state Co-operative Electric & Power Co. has been allotted $198,000 REA loan in the projected construction of 203 miles of rural power transmitting lines.

GUTHRIE, OKLA. — City has plans underway for improving its waterworks at approximate cost of $47,000.

TALIHINA, OKLA. — City plans to build a waterworks plant of the rapid sand filter type at cost of about $26,000. G. M. Brown, McAlester, Okla., consultant.

Wisconsin

BOSCOBEL, WIS. — Tri-state Power Co-operative association plans to build a steam-electric power plant costing $100,000 to supply rural distribution lines. Wisconsin development authority, Madison, Wis., engineer.

MENASHA, WIS. — Marathon Paper Mills Co., Wausau, Wis., plans to erect new two-story paper mill and power plant here, 110 x 300 feet. Frank Gruper, chief engineer.

MILWAUKEE—Acme Galvanizing Inc., Irving Herrmann, president, will equip new factory quarters following almost complete destruction of its plant with loss estimated at $25,000.

MILWAUKEE — Milwaukee Coca-Cola Bottling Co., 1630 North Eleventh street, plans to begin work soon on new two-story, 160 x 165-foot plant. Cost estimated at $300,000, including equipment. R. H. Coe, vice president, in charge.

Minnesota

CAMBRIDGE, MINN. — Village, S. R. Bronniche, recorder, will have plans ready in spring for construction of a municipal power plant to cost $200,000. Ralph D. Thomas & Associates, Minneapolis, consulting engineers.

DELANO, MINN. — City, O. B. Hildebrand, chairman of water and light commission, is preparing plans for installing a new boiler, constructing an addition, and making other improvements at its power plant. G. M. Orr & Co., Minneapolis, consulting engineers.

DULUTH — Edward Mfg. Co. Inc. has been organized to manufacture and deal in mechanical appliances by E. E. Webber, Alden Hammerbeck and George May.

KETTLE RIVER, MINN.—Carlton County Co-operative Power association, Matt Wilson, manager, has awarded contract to Franzen Bros., Palisade, Minn., for constructing 253 miles of rural transmitting lines. Federated Electric Co-operative association, Anoka, Minn., consulting engineer.

MINNEAPOLIS — Hamilton Corp. Inc. has been formed to deal in all types of machinery by J. F. Hamilton, G. R. Anderson and L. L. Parrish.

PRESTON, MINN. — Fillmore County Co-operative Electric association, Earl Kjos, manager, has let contract to Langford Electric Co., Minneapolis, at $146,472, for construction of 204 miles rural power lines. Toltz, King & Day and Banister Engineering Co., St. Paul, are consulting engineers.

ROCHESTER, MINN. — Peoples Co-operative Power association, Jay Carroll, secretary, has awarded contract for constructing 166 miles of electric power lines costing $134,427 to Cater Construction Co., Kansas City, Mo. Ellerbe & Co., St. Paul, engineers.

TRACY, MINN. — City, H. M. Algyer, recorder, is taking bids to 2 p.m., Jan. 20, on construction of a sewage plant involving considerable mechanical equipment. Certified check 5 per cent to accompany bids. P. C. Bettenburg, St. Paul, consulting engineer.

Texas

HOUSTON, TEX.—Big Three Welding Equipment Co. Inc. has plans nearly completed and soon will call for bids on constructing two-story, brick and welded steel office building and warehouse with central heating plant; cost estimated $50,000.

TEXARKANA, TEX. — PWA has approved $300,000 loan to city in the proposed construction of a municipal power plant costing about $545,000. Edward Levee, city attorney.

Kansas

TOPEKA, KANS.—Kaw Valley co-operative, Ben Pressgrove, president, has rejected bids on construction of 71 miles rural electric lines and will soon readvertise for bids. Paulette & Wilson, Salina, Kans., consulting engineers. (Noted Oct. 24.)

North Dakota

LINTON, N. DAK. — Emmons County Light & Power Co. will soon install a new 300-horsepower diesel engine, switchboard and other equipment at cost of $22,000.

WAHPETON, N. DAK. — Otter Tail Power Co., Fergus Falls, Minn., plans to enlarge its power plant here and will install a 10,000-kilowatt turbine at total cost of about $400,000.

Nebraska

DAVID CITY, NEBR. — Butler County Rural Public Power district, Phillip Tomek, president, is receiving bids to 10 a.m., Jan. 26 on construction of 137 miles of rural electric lines at estimated cost of $122,640. Certified check or bid bond 5 per cent to accompany bid. H. H. Henningsen Engineering Co., Omaha, Nebr., consulting engineer. (Noted Nov. 28.)

GRAND ISLAND, NEBR. — REA has allotted $164,000 loan to Hall County Rural Public Power district to finance construction of 121 miles rural electric transmission lines. O. R. Toman, Lincoln, Nebr., consultant.

OMAHA, NEBR. — Omar Milling Co. has awarded general contract for construction of a $40,000 warehouse to Parsons Construction Co., 701 North 20th street. John & Allan MacDonald, Omaha, architects and engineers.

Iowa

BROOKLYN, IOWA — T. I. P. Rural Electric co-operative, Irvin L. Nervig, superintendent, has awarded contract to W. D. Phelan & Co., Davenport, Iowa, for constructing 132 miles of rural power transmission lines. K. R. Brown, Des Moines, Iowa, consulting engineer.

NEW HAMPTON, IOWA — City, J. W. Wittenburg, city engineer, is preparing plans for installing a new 750-kilowatt diesel engine and making alterations in its power plant.

OSKALOOSA, IOWA—Mahaska county is building a two-story shop and machinery plant, 60 x 70 feet, to house road machinery and machine shop.

SIOUX CITY, IOWA—Sioux City Gas & Electric Co., G. A. Neal, president, contemplates installing a 725-pound pressure boiler, a 2000-horsepower turbine unit, and making other improvements in its power plant at total cost of $100,000.

WATERLOO, IOWA — Rath Packing Co. plans to install electric power equipment in new five-story addition to its packing plant. Project will cost over $300,000.

Wyoming

CASPER, WYO. — Bureau of reclamation, department of interior, Casper, takes bids to 10 a.m., Jan. 26, on construction of a 115,000-volt, 3-phase, 60-cycle transmission line from Seminoe dam 142 miles to Cheyenne, Wyo. Certified check 10 per cent to accompany bid.

Montana

MILES CITY, MONT.—City, Harry Riccius, mayor, is contemplating construction of a water softening plant in conjunction with its water system.

Pacific Coast

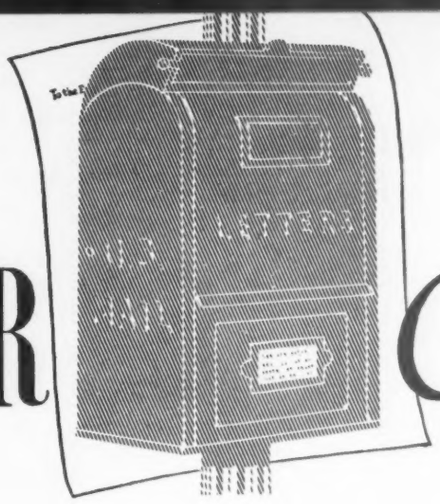
FALLBROOK, CALIF. — Fallbrook utility district asks bids on diesel-driven centrifugal pumps, deep well turbine, generator and concrete reservoir.

PORTLAND, OREG. — Chase Bag Co., 155 East 44th street, New York, has let general contract for construction here of a 60,000-square foot manufacturing plant costing $100,000 to Austin Co., New York.

Canada

CRANBROOKE, B. C. — City, F. W. Burgess, clerk, asks bids to Jan. 24 on construction of a hydro-electric power plant on St. Marys river, and an emergency diesel station at total cost of about $125,000.

YORK, ONT. — Township plans to build a hydro-electric system during 1939 at cost exceeding $800,000.



READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

No Reflection

To the Editor:

In reading STEEL of Jan. 9 I was surprised to find on page 43, under crane lubrication, a lengthy description of a means to lubricate crane journal bearings by means of block grease for the elimination of oil drip, and at the same time to find that our lubricator, Stapax, was not mentioned.

It might be of interest to you to know that we have sold thousands of our Stapax journal lubricators to steel mills all over this country and that through the application of our pad, oil drippage has been reduced to a minimum.

In fact, one of the main reasons for the use of Stapax has been this elimination of oil drippage and we have in many instances found that our device has been put in to replace a grease block, due to the fact that under certain working conditions the grease block did not give lubrication.

H. F. HACKEDORN JR.
General Manager,
Lubrication Products Co.,
Cleveland

(Editors' Note—The article intended no reflection on Stapax by reason of the fact it was not mentioned. As stated in a footnote, it was abstracted from *Lubrication*, published by the Texas Co., New York.)

Yearbook Used All Year

To the Editor:

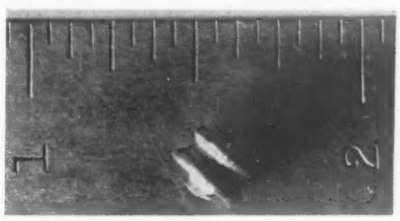
The Yearbook of Industry has been received and we wish to congratulate you on its completeness. We have used previous issues continuously through the years and hope to have the same benefit from this copy.

THOMAS J. QUINN
Vice President-General Manager,
W. F. Potts, Son & Co. Inc.,
Philadelphia

Is This Smallest Casting?

To the Editor:

Enclosed is a casting, made of gray iron, which weighs 0.5859 grams. This means it takes 48 of them to weigh an ounce, or 772 to the pound. These tiny castings were made commercially some years ago



Miniature casting photographed on an inch of ruler

by the Sessions Foundry Co., Bristol, Conn., which can supply further information about them.

G. P. ALBRECHT
George F. Pettinos Inc.,
Philadelphia

(Editors' Note—This letter was prompted by a recent communication on this page describing a casting weighing 25 to the ounce. Sessions Foundry Co. replied to an inquiry in the subjoined letter.)

To the Editor:

We are pleased to note your interest in the tiny casting which was sent to you by Mr. G. P. Albrecht.

These little castings were used as chaplets on a job which we produced several years ago. We had no difficulty whatever in producing them from a gate of brass patterns which we made ourselves. Several of them were placed in the mold to hold the core in position and they welded into the casting very nicely.

J. B. SESSIONS
President,
Sessions Foundry Co.,
Bristol, Conn.

Finds Complete Coverage

To the Editor:

My sincere congratulations upon the Jan. 2 issue of STEEL, which is a n outstanding accomplishment, both in conception and actual content.

Without dimming the light upon the editorial department's excellent work, I must add that I find the advertising pages fascinating, too.

Combined, you've set a high precedent.

DEAC MARTIN
649 *Union Commerce building,*
Cleveland

Outstanding Conception

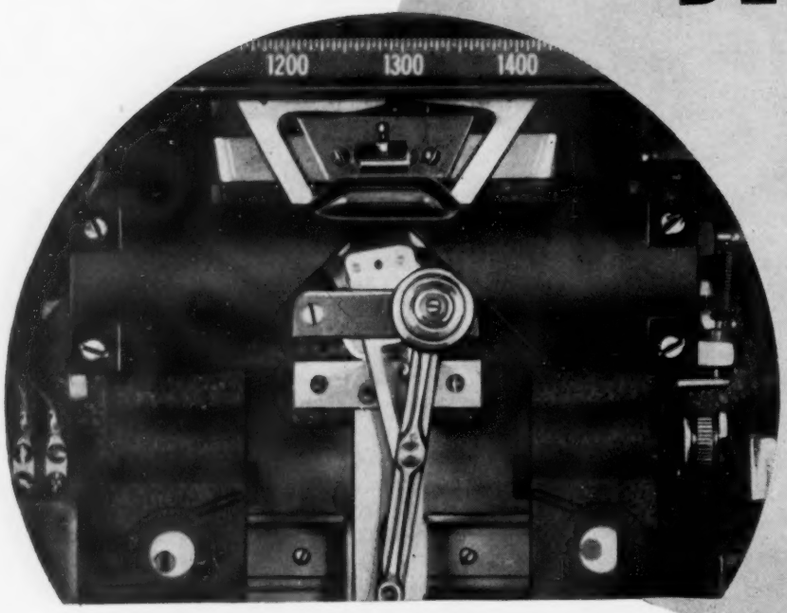
To the Editor:

We wish to acknowledge receipt of your Yearbook of Steel, for which we thank you.

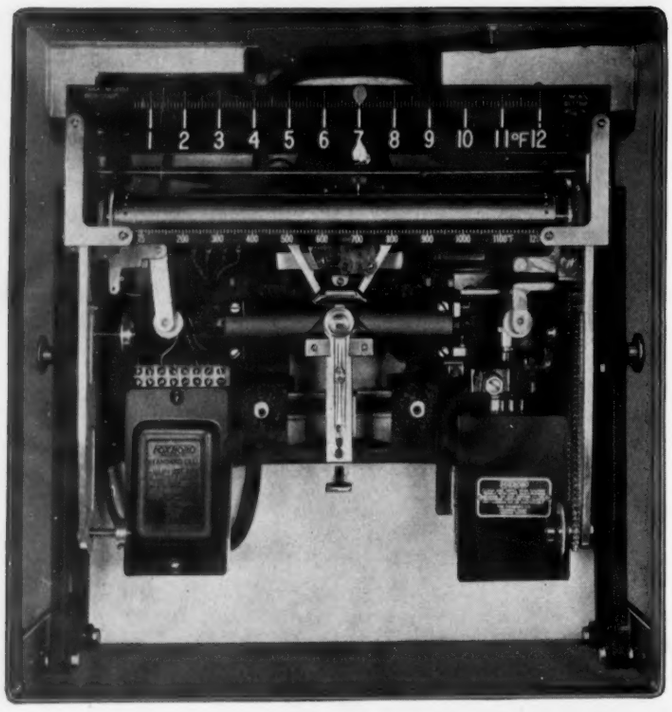
We also wish to compliment you on the very complete covering of the markets as of the day.

H. B. IRWIN
Purchasing Agent,
Harris, Seybold, Potter Co.,
Dayton, O.

UNIQUE DESIGN



ASSURES . . . sensitive control with accurate measurement and long maintenance-free life



Fast recording with *slow* mechanical motion feature the Foxboro balancing mechanism. Its unique rolling action is silent and enduring. Its response to thermocouple changes is instantaneous and accurate with a uniform sensitivity over the entire scale. » » » Foxboro combines slide wire contact, recording pen and control actuating mechanism in one integral unit. They move as one . . . no linkages, belts or gears between them to cause inaccuracies. Every change in measurement effects a corresponding movement of the recording pen and the control actuating mechanism. Precision temperature control is the unvarying result. » » » Contact construction permits a flexibility that makes possible the operation of both regulating apparatus and signals from one instrument. All of the features that contribute to make this new instrument outstanding are given in complete detail in Bulletin 765. Write for a copy.

THE FOXBORO COMPANY
118 Neponset Avenue, Foxboro, Mass., U.S.A.
Branch Offices in 25 Principal Cities

FOXBORO
REG. U. S. PAT. OFF.

RECORDING CONTROLLING PYROMETER